



BANK FOR INTERNATIONAL SETTLEMENTS

## BIS Papers

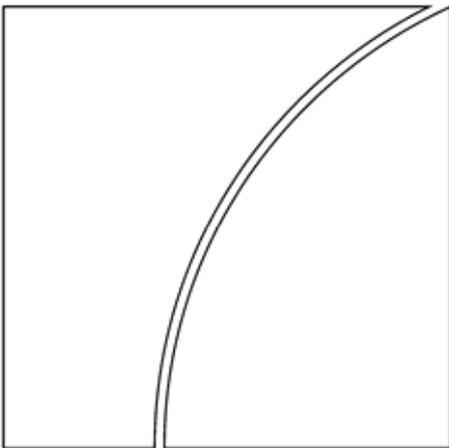
No 36

### New financing trends in Latin America: a bumpy road towards stability

Proceedings of a joint meeting organised by the BIS  
and the Federal Reserve Bank (FRB) of Atlanta in  
Mexico City, May 2007

Monetary and Economic Department

February 2008



Papers in this volume were prepared for a meeting organised by the BIS and the Federal Reserve Bank (FRB) of Atlanta in Mexico City in May 2007. The views expressed are those of the authors and do not necessarily reflect the views of the BIS or the institutions represented at the meeting. Individual papers (or excerpts thereof) may be reproduced or translated with the authorisation of the authors concerned.

Requests for copies of publications, or for additions/changes to the mailing list, should be sent to:

Bank for International Settlements  
Press & Communications  
CH 4002 Basel, Switzerland

E-mail: [publications@bis.org](mailto:publications@bis.org)

Fax: +41 61 280 9100 and +41 61 280 8100

© *Bank for International Settlements 2008. All rights reserved. Brief excerpts may be reproduced or translated provided the source is stated.*

ISSN 1609-0381 (print)

ISBN 92-9131-746-2 (print)

ISSN 1682-7651 (online)

ISBN 92-9197-746-2 (online)

## Foreword

In May 2007 the Bank for International Settlements (BIS) and the Federal Reserve Bank (FRB) of Atlanta hosted a meeting in Mexico City on “New financing trends in Latin America: a bumpy road towards stability”. The meeting, which was chaired by Philip Turner of the BIS, brought together senior officials from central banks, finance ministries, the private sector, multilateral institutions and academia to discuss issues and challenges from the most recent financing developments observed across the region.

Five main issues were addressed at the meeting: recent trends in Latin America, the influence of certain idiosyncratic features on financial developments in the region, the benefits and challenges of the development of domestic local currency bond markets, the implications for monetary policy and the coordination of debt management policies between central banks and finance ministries and, finally, the implications for financial stability.

This meeting was a “first” as a collaborative effort between the BIS and the FRB Atlanta, and was organised at the initiative of the BIS Representative Office for the Americas (inaugurated in 2002) and the FRB Atlanta Americas Center (created in 2005). Given the significance of the topics discussed, we decided to publish in this BIS Papers series the contributions by José Antonio Ocampo (United Nations Under-Secretary General for Economic and Social Affairs) and Professor Barry Eichengreen (University of California, Berkeley), a contribution by the Bank of Spain, and the background documents prepared for this event.

We would like to thank all the participants in the meeting for their valuable contributions to the discussions. Also, we would like to thank Camilo E. Tovar (BIS) and Myriam Quispe-Agnoli (FRB Atlanta) for coordinating and organising the meeting, as well as for putting together this publication.

Gregor Heinrich  
Chief Representative  
Office for the Americas  
Bank for International Settlements

Thomas J Cunningham  
Vice President  
and Associate Director of Research  
FRB Atlanta



## List of participants

### Central banks and ministries of finance

<b>Argentina</b>	Central Bank of Argentina	<b>Martin Castellano</b> Chief of Staff
	Ministry of Economy and Production (MECON)	<b>Marta Elsa Zaghini</b> Deputy Secretary for Financial Services
<b>Belize</b>	Central Bank of Belize	<b>Sydney Campbell</b> Governor
<b>Bolivia</b>	Central Bank of Bolivia	<b>Osvaldo Nina</b> Member of the Directory
<b>Canada</b>	Bank of Canada	<b>Philipp Maier</b> International Department
<b>Chile</b>	Central Bank of Chile	<b>Alejandro Jara</b> Senior Economist, Head of Financial Institutions
	Central Bank of Chile	<b>Alejandra Marinovic</b> Senior Economist, Financial Operations Division
<b>Colombia</b>	Bank of the Republic	<b>Fernando Tenjo</b> Board of Directors
<b>Costa Rica</b>	Central Bank of Costa Rica	<b>Ivannia Solano</b> Analysis and Economic Adviser Department
<b>El Salvador</b>	Central Research Bank of El Salvador	<b>Edgar Cartagena</b> Senior Economist, Financial Development Department
<b>Europe</b>	European Central Bank	<b>Ettore Dorrucchi</b> Deputy Head of Division
<b>Mexico</b>	Bank of Mexico	<b>Julio Santaella</b> Manager, Information and Analysis Central Banking Operations
	Bank of Mexico	<b>Alfredo Sordo</b> Deputy Manager, Market Operations
	Bank of Mexico	<b>Pablo Graf</b> Financial System Analysis
	Bank of Mexico	<b>Alejandro Gaytán</b> Deputy Manager, Macrofinancial Analysis Department

<b>Mexico</b> (cont)	Ministry of Finance (SHCP)	<b>Gabriela Basurto</b> Securities Director
	Ministry of Finance (SHCP)	<b>Alicia Nuñez</b> Public Debt and Credit
<b>Spain</b>	Bank of Spain	<b>Carmen Broto</b> International Economy
<b>Uruguay</b>	Central Bank of Uruguay	<b>Gerardo Licandro</b> Head Economic Research
<b>USA</b>	Federal Reserve Bank of New York	<b>John Clark</b> Emerging Markets & International Affairs
	Federal Reserve Board	<b>Carlos Arteta</b> International Finance Section

## International institutions

Economic Commission for Latin America and the Caribbean	<b>Luis Felipe Jimenez</b> Expert
Asociación de Supervisores Bancarios de las Américas	<b>Rudy Araujo</b> Secretary General
Centro de Estudios Monetarios Latinoamericanos	<b>Fernando Sánchez Cuadros</b> Manager, Technical Meetings for Central Banks
Inter-American Development Bank	<b>Morgan Doyle</b> Financial Specialist
International Monetary Fund	<b>Jack Joo Ree</b> Senior Economist, Capital Market Development & Infrastructure Division

## Keynote speakers

United Nations	<b>Jose Antonio Ocampo</b> Under Secretary General for Economic and Social Affairs
University of California, Berkeley	<b>Barry Eichengreen</b> Professor, Economic Department

## **Private sector**

HSBC

**Federico Casas**

Sales Global Markets

Standard & Poor's

**Victor Herrera**

Managing Director, Head Office

Standard & Poor's

**Mariana Torán**

Associate Director, Public Finance Ratings

## **Federal Reserve Bank of Atlanta**

**William B. Estes III**

Senior Vice President

Supervision and Regulation

**Thomas J. Cunningham**

Vice President and

Associate Director of Research

**Richard MacNamara**

Supervision and Regulation

**Stephen J. Kay**

Americas Center Coordinator

Research Department

**Myriam Quispe Agnoli**

Economist, Research

**Diego Vilan**

Economist, Research

**Federico Mandelman**

Economist, Research

## **Bank for International Settlements**

**Philip Turner (Chairman)**

Head Secretariat Group

**Gregor Heinrich**

Chief Representative for the Americas

**Camilo Tovar**

Economist

**Michela Scatigna**

Economist



## Contents

Foreword.....	iii
List of participants.....	v
New financing trends in Latin America Camilo E Tovar and Myriam Quispe-Agnoli.....	1
Financing trends in Latin America Myriam Quispe Agnoli and Diego Vilán .....	15
Policy space and the changing paradigm in conducting macroeconomic policies in developing countries José Antonio Ocampo and Rob Vos.....	28
Latin America’s local currency bond markets: an overview Serge Jeanneau and Camilo E Tovar.....	46
Financial stability implications of local currency bond markets: an overview of the risks Serge Jeanneau and Camilo E Tovar.....	65
Local debt expansion and vulnerability reduction: an assessment for six crisis-prone countries Paloma Acevedo, Enrique Alberola and Carmen Broto.....	88
Plumbing for Latin American capital markets Sudarat Ananchotikul and Barry Eichengreen.....	110
Domestic securities markets and monetary policy in Latin America: overview and implications Serge Jeanneau and Camilo E Tovar.....	140



# New financing trends in Latin America<sup>1</sup>

Camilo E Tovar and Myriam Quispe-Agnoli

## 1. Introduction

The transformation of financing, the changing nature of financial risks and the resulting policy challenges were the main topics of a meeting on “New financing trends in Latin America: a bumpy ride towards stability” held in Mexico City on May 26–27, 2007 and jointly organised by the Bank for International Settlements and the Federal Reserve Bank of Atlanta. This introduction is an overview of selected issues discussed by central banks, finance ministries, multilateral institutions, academics and private sector participants.

Financial markets in Latin America have experienced a major transformation during the past 15 years. One of the most noticeable changes has been the shift from cross-border towards domestic financing. This has allowed domestic capital markets to expand, deepen and diversify and therefore become less dependent on bank financing. The first part of the meeting thus looked into the changes in financing and the factors driving them. The second and third parts discussed the development of domestic bond markets. Specifically, the second part of the meeting raised questions regarding the benefits for sovereigns of issuing in local currency, the pros and cons of doing so in domestic vis-à-vis international markets, the status of private markets, the role of structured finance and the extent to which developing these markets remains a policy objective for de-dollarising the economies in the region. The third part focused on policy challenges arising from developing domestic bond markets, such as those arising as a result of the emergence of new instruments or investors in the market, or the scope for a regional bond market.

The fourth part of the meeting discussed the implications of new financial markets for the transmission of monetary policy and the role that authorities play in developing these markets. Lastly, the financial stability implications of the new financing channels were discussed.

The remainder of this introductory article offers a brief account of the topics discussed at the meeting while highlighting their connexion with the papers published in this volume.

## 2. What has changed in financing in recent years?

In this volume, two papers analyse the recent transformation of financing in more detail. Quispe and Vilan (2008) describe the evolution of financial markets, portfolio flows, foreign direct investment (FDI), domestic banking sectors and workers’ remittances during the period 1990–2005. Jeanneau and Tovar (2008a) provide an overview of bond markets in local currency. Some of the key features highlighted in these studies are the following. First, domestic financing has expanded vis-à-vis external financing. Second, bond markets in local currency have become an alternative source of financing, relative to external dollar-denominated securities and bank financing. Third, FDI and workers’ remittances to the region

---

<sup>1</sup> The views expressed by the authors do not necessarily reflect those of the BIS, the FRB Atlanta or participant institutions at the meeting. We thank Alejandro Jara, Serge Jeanneau and Philip Turner for their comments and Alejandra Gonzalez for editorial support.

have become the main source of financing. These developments should make the structure of capital flows less volatile than in the past and make local borrowers less exposed to exchange rate risk.

### **The role of foreign and domestic factors**

The changes recently observed in the structure of financing across the region reflect both external and domestic influences. In the first part of the current decade a benign **external environment** characterised by low real interest rates worldwide and decreased levels of risk aversion compressed the sovereign spreads on the region's external debt to historically low levels.<sup>2</sup> In addition, high commodity prices have led to very favourable terms of trade for the region and a significant expansion of exports.

**Domestic policies** have also improved, allowing a higher marginal propensity to save out of increased income than in the past. This is evident in the reduction of debt ratios, the unprecedented current account surpluses and the increased levels of international reserves. Some of the relevant changes in policies include: the shift toward moderately countercyclical fiscal positions (achieved by saving a large part of the increased revenues and generating significant primary surpluses); new government debt management policies aimed at improving sovereign debt profiles and reducing currency and maturity mismatches; more credible monetary and exchange rate frameworks; and better supervisory frameworks.

### ***The role of external factors: a sustainable external environment?***

How sustainable is this favourable external environment and what are the implications for the dynamics of capital flows? Clearly, the favourable terms of trade observed in the region during the past few years will not last forever and global imbalances will have to adjust at some point. The issue is the degree to which this will affect the economies in the region and whether it will induce a reversal in the development of capital markets. It seems unlikely that a reversal would have a significant impact in Latin American economies. In fact, the region has weathered recent large shocks in financial markets rather well (eg May–June 2006, February–March 2007 and most recently the one that began in July 2007). That said, four worries are often mentioned: (i) asset prices can become overvalued; (ii) an important share of flows seems speculative in nature, especially those associated with “carry trades”; (iii) financial markets in the region are still immature and investors are just discovering how these markets work; and, finally, (iv) in some countries the favourable external environment may have reduced the incentives to pursue deeper reforms, in particular at the microeconomic level (eg legal and regulatory regimes).

### ***The role of domestic factors: have policies improved the resilience of the economies?***

There was a consensus that better macroeconomic policies had improved the resilience of the region to adverse shocks. Indeed, sound fiscal positions are considered to be a key factor in such improvement. Several countries have implemented fiscal responsibility laws (eg Brazil, Chile and Peru) which should reduce the procyclicality of fiscal policies. This, together with new debt management practices aimed at improving debt profiles, has contributed towards reducing macroeconomic vulnerabilities. In addition, the new monetary frameworks adopted in most countries have led, not just to lower inflation, but also to lower and less volatile interest rates. This has helped in creating a more stable environment for

---

<sup>2</sup> Financial innovation and the possibility of diversifying risk in financial markets were also cited as important factors behind lower risk premia and aversion.

growth and investment. Finally, more credible exchange rate regimes appear to have played an additional supporting role.

Nevertheless, some participants considered that in some countries macroeconomic policies need to be improved, for instance by reducing procyclicality or avoiding significant exchange rate appreciation. The latter was considered undesirable as it created vulnerabilities, which called for a more active policy. The source of exchange rate overvaluation was seen in terms of trade above the long-run equilibrium level or in capital flows that had a large speculative component, say, as a result of “carry trade” activities associated with low interest rates in some developed economies (eg Japan and Switzerland).

Certainly, controversies do remain in the region regarding macroeconomic policies. The article by Ocampo and Vos in this volume argues for a broader view of macroeconomic policies in developing countries, one with a more developmental and growth-friendly approach, that takes steps towards mitigating possible procyclical effects associated with the workings of financial markets, provides more stable aid inflows, deepens financial markets and strengthens domestic financial governance structures. The authors argue that, in an environment of volatile capital flows, exchange rate fluctuations generate additional difficulties. Although they recognise the weaknesses associated with fixed exchange rate regimes, they consider that free floating regimes are not desirable as they tend to induce significant overvaluations in good times, downward overshooting in bad times, excess volatility in financial markets and distortion in a country’s international specialisation pattern.

However, others disagreed with the views expressed above and doubted that countries should avoid large real exchange rate appreciations: they viewed the recent exchange rate trends as being the result of a normal equilibrium response to stronger fundamentals in line with the improved policy credibility. This last element was stressed, as it meant that agents should expect better policy reactions to different economic developments and shocks. A similar argument was made regarding the development of domestic markets. As markets mature, they should improve the economies’ capacity to cope with shocks and other structural changes.

### **How is the current period of expansion different from the past?**

What is different about the current expansionary episode? Several factors were highlighted: countries in the region are now running current account surpluses rather than deficits; fiscal policy is generally more disciplined; consumption growth is not so prominent; and most borrowing is being undertaken by the private rather than by the public sector. In addition, capital flows are taking place against the backdrop of stronger financial systems and increasing investor sophistication.

In this context, transparency has a greater value. For this reason, bad policies appear to be more heavily penalised by the markets today than in previous decades. In addition, economies seem to be more disciplined, which is a required element for currencies to mature and for markets in local currency to develop.<sup>3</sup>

What can policy makers do to deal with capital flows? The answer is not obvious as many trade-offs continue to arise. For instance, the tightening of monetary policy to curb excess demand could trigger an increase of capital inflows. In contrast, lowering interest rates could have inflationary effects. Fiscal tightening would work but further tightening might be politically difficult to implement. Higher bank liquidity and reserve requirements do not appear to be an option in most countries due to the development of domestic capital markets. With

---

<sup>3</sup> Some participants indicated that market discipline should not be overvalued as it has proven to be procyclical, ie inexistent during booms, and excessively present during crises.

the new financial market structure, financial funds are likely to flow through channels other than the banking system. For the same reason, it is unlikely that capital controls or Tobin-type regulations would work, although the region has seen some recourse to such controls in a number of countries (eg Argentina or Colombia).

### **3. The development of domestic bond markets**

The rapid expansion of domestic bond markets is among the most notable financial developments seen in emerging market economies (EMEs) in recent years (see CGFS (2007)). Jeanneau and Tovar (2008a) offer a detailed characterisation of such markets in Latin America. Much of the meeting was devoted to the analysis of issues and policy implications associated with these markets. In particular, several issues were raised aimed at: (i) drawing attention to lessons learnt by sovereigns over a decade of issuance; (ii) discussing the pros and cons of issuing global bonds in local currency and finally; (iii) disentangling the factors behind the relatively slow progress made in developing domestic corporate bond markets. The remainder of this section offers a more detailed overview of these topics.

#### **Lessons from sovereign financing**

Sovereign financing in domestic bond markets offers important potential benefits as it can help to avoid currency mismatches, strengthen the domestic financial system, and allow other associated markets to develop, such as the corporate bond market or the derivatives markets. Furthermore, macroeconomic stability is strengthened and vulnerability to external shocks reduced.

At the meeting, several lessons arising from developing government debt markets were mentioned. First was the importance of a diversified investor base to ensure the sustainability of the process (also see Section 4). In this respect pension fund reform was considered a key element for encouraging the development of these markets, and the presence of both domestic and foreign investors essential for a resilient market. Given the Mexican experience, the presence of foreign investors in domestic markets was thought to offer diversification gains while at the same time helping extend the duration of debt in local currency.

A second element highlighted was the need for a gradual process. It is important to allow the market time to adjust as the yield curve develops, with the authorities making adjustments as necessary.

Finally, some participants said that local currency bond issuance was not always necessary, particularly if the government was a small issuer, as this could fragment the investor base and delay market development. This raised another issue: should countries denominate all their debt in local currency or not? In general, some currency diversification appeared desirable. Nonetheless, some governments with a history in the region of excessive foreign currency debt have announced in recent years that they would not issue more debt in foreign currency. Obviously, in discussing these issues the need to identify whether currency or maturity risk was more relevant became necessary. As shown by Jeanneau and Tovar (2008a) *long-term foreign currency* denominated debt has sometimes been exchanged for *shorter-term domestic currency* denominated debt, thus increasing maturity risk. Although this can be a source of concern, there was consensus that, in most recent crisis episodes, currency exposures were more relevant than maturity exposures.

## **Global bonds denominated in local currency**

Colombia, Brazil, Peru and Uruguay have all issued global bonds in local currency. This development has raised two questions: what are the advantages or disadvantages of such issuance, and what lessons does this experience offer to smaller economies or economies moving out from turbulent times?

Global bonds denominated in local currency can attract those who wish to avoid the idiosyncrasies of investing in local markets; such bonds avoid currency mismatches and allow an extension of the longer part of the yield curve in local currency (as in Brazil and Peru). Nevertheless, global bonds could limit liquidity in domestic markets if they segmented the investor base.

As for the second question, these bonds were seen as having been useful for smaller economies needing to reconstruct financial markets following a crisis. For example, the use of these bonds after the 2002 Uruguay crisis left benefits in three areas: (i) fiscal sustainability; (ii) deepening private debt markets; and (iii) monetary policy.

Foreign currency denominated debt can aggravate procyclical fiscal pressures: in good times when the exchange rate is appreciated debt ratios fall. However, in bad times when the currency depreciates debt ratios increase (see the discussion in Section 6). Therefore, by reducing dollar-denominated debt, bonds in local currency reduce the procyclicality of debt and improve its sustainability.

Global bonds in local currency made available in both nominal and inflation-indexed terms allow a better measurement of expected inflation. In addition, when issued, agents in both domestic and international markets track the behaviour of the monetary authority more closely, thus creating a sort of “disciplinary effect”.

Nevertheless, global bonds are in general a second-best or temporary substitute for a liquid domestic bond market. In particular, it is unclear whether such bonds in the hands of foreign investors reduce the external vulnerabilities of economies that issue them.

## **Private sector issuance**

The expansion of local currency bond markets in the region has been dominated by the public sector. Corporate bond markets remain small and their development lags the progress seen in other regions of the world (eg Asia). Why?

One aspect, addressed by Ananchotikul and Eichengreen (2008), is corporate governance. The article discusses why progress in corporate governance in the region has not been faster; and how capital markets would benefit from further reform in this area. The authors argue that improvements in corporate governance have taken place in countries with stable governments prepared to pay the “upfront” cost of reform and where foreign investors are ready to lobby for reform. They also argue that in Latin America corporate governance reform is incomplete. Based on their econometric analysis, the authors conclude that specific actions can contribute towards its promotion, such as maintaining a stable macroeconomic environment, opening to foreign investment and ensuring a stable political environment. Such elements provide the incentive for investors and governments to invest in the future.

Participants at the meeting indicated that the underdevelopment of corporate bond markets in the region could also be attributed to a number of factors. The first of these was the segmentation of corporate markets in terms of size and creditworthiness. Large and creditworthy companies have access to a number of credit markets (eg banking, public, or international); while medium-sized companies in general lack access to markets. Equally important, the regulations on pension funds only allow investment in domestic securities with a minimum rating, thus limiting the type of companies in which to invest. Second, prevailing fiscal frameworks may weaken the attractiveness of these markets. For instance, in Mexico income from government securities is tax-free, but this is not the case for corporate debt.

Third, governments in most countries have focused on increasing the liquidity of the secondary government debt markets rather than enhancing that of corporate bond markets. For instance, in most countries in the region repurchase agreement (repo) transactions with central banks exclude private sector bonds or structured securities as collateral. In Mexico, the central bank allows repo transactions for highly rated debt. However, even there an efficient secondary market for private sector securities is still non-existent. Finally, some argued that the development of corporate bond markets could be hampered by the lack of foreign investors in the domestic markets.

### **Domestic versus cross-border issuance**

Has the reduction in the issuance of sovereign bonds in international markets “left room” for corporate issuance abroad? And how do companies choose between international and domestic issuance?

The implications for the private sector associated with lower sovereign debt issuance in international markets vary significantly across the region. In Mexico, the most creditworthy private companies enjoy access to domestic financing at low spreads over the sovereign benchmark. The only private sector issuers that tap international markets are those with low ratings, which cannot issue domestically or those that look for long tenors for their bonds.<sup>4</sup> Therefore, while in Mexico there appear to be plenty of opportunities for corporate issuance abroad, this is not the case in other countries in the region. For instance, in Brazil the complications of financing in the domestic market for private companies seem to favour cross-border financing. This is thought to be the case because the government still refinances large portions of short-term foreign currency debt in the domestic market and real interest rates remain high. As a result, markets demand a substantial premium even from the government.

For companies with the ability to issue locally, the manner in which they choose between domestic or foreign financing is thought to depend on two main factors. If a window of opportunity appears in domestic markets with respect to cost, companies will normally issue domestically. However, with the exception of Mexico and Chile, if low-cost and long-term financing is required (eg at 15–20 years), then financing abroad is easier.

### **The asset-backed securities (ABS) market**

The ABS market in Latin America, which has expanded rapidly during the past few years, is still in its infancy (see Scatigna and Tovar (2007)). Furthermore, Mexico and Brazil account for nearly two-thirds of the regional activity in this market. Given its implications for corporate bond markets, participants were asked about the prospects for increased ABS issuance, their contribution to improving local capital markets and, finally, whether they have widened access to bank credit. Since the Mexican market has developed more rapidly than markets in other countries of the region, special attention was given to this market.

In Mexico, different assets are pooled for securitisation. However, mortgage-backed securities (MBSs) are the dominant transactions. Sofoles (non-banking institutions) which provide loans for different credit segments, including mortgage credit, dominate the market. Banks have not securitised much, partly because of much reduced credit extension after the 1994 crisis. However, some banks are slowly issuing plain vanilla bonds and issuing structured transactions, mainly against residential mortgages.

---

<sup>4</sup> However, it was considered just a matter of time before these companies, which can only find long-term financing abroad, begin accessing the long-term domestic market.

Securitisation can help spread risk, but it can also create risks. For this reason, the Mexican authorities indicated that they have worked on enhancing the securitisation framework in areas such as the monitoring of credit provisions.

At the time of the meeting, the prospects for ABS growth in the region appeared to be positive. However, participants indicated that this optimism did not necessarily reflect fundamental changes in the underlying market. In particular, it was mentioned that these positive prospects often reflect expectations of growth associated with regulatory bottlenecks that need to be removed. In Mexico, for example, pension fund regulators initially adopted very tight controls, thus forcing pension funds to invest only in government securities. However, with time, the supply of government paper became insufficient for pension fund needs, thus prompting regulatory changes that led to greater investment in highly rated companies. Markets today are facing similar phenomena as regulatory restrictions limit the investment in lower-rated companies.

Structured transactions were also said to be helping smaller companies tap the markets. At the same time, however, it was believed that the process was likely to develop differently than in developed countries. In Europe or the US, companies sell their own risk and then issue structured transactions. In Latin America, the process appears to be operating the other way round, which might imply a lengthy and expensive process.

#### **Does de-dollarisation remain an objective of policy in some countries?**

The favourable external environment in recent years has created a window of opportunity to reduce the degree of dollarisation in the region: for a recent in-depth review, see Armas et al (2006). Participants in this meeting were asked about the extent to which this remains a policy objective and the role that new tools, such as local currency bond markets, could play in this area.

Highly dollarised countries (eg Bolivia, Peru or Uruguay) have issued local currency debt. This appears to be stimulating and strengthening the de-dollarisation process. However, participants indicated that the policy objective of issuing such debt is not de-dollarisation per se, but reducing financial fragility. As a result, the strategy has implied changing the regulatory frameworks so that financial institutions internalise the risk of dollarisation. In countries like Uruguay, the strategy has been aimed at inducing a shift in banks' balance sheets towards local currency denominated securities.

Participants felt that for local currency bond markets to support the de-dollarising process, it is necessary to determine, at least for the short and medium run, whether to develop a fully nominal market or whether to adopt an inflation-indexed framework. Although indexation may create difficulties in the longer run by limiting the central bank's capacity to lower inflation, it may at the same time offer benefits in the short run if there are concerns about the sustainability of the process, say, because of concerns regarding fiscal policies.

#### **4. Policy challenges: instruments and the investor base**

The development of local currency bond markets raises important policy challenges. Three specific ones were discussed at the meeting. The first had to do with the variety of instruments available in the markets. The second covered how to induce foreign investment in local currency bonds so as to promote risk dispersal. Finally, measures to broaden the investor base were discussed.

## **Variety of instruments available in domestic bond markets**

A wider variety of debt instruments complete markets and provide hedges for various risks. How should sovereign debt managers, in framing issuance strategies, strike a balance between market completeness and liquidity?

Developing bond markets was said to require careful coordination at different levels. On the demand side, participants highlighted the need to know who would demand the securities, to have an open dialogue with investors and to listen to their needs. This was well illustrated by the Mexican experience, where an open dialogue with foreign investors was key for introducing new securities (they are the largest purchasers of long-term securities). Conversations with institutional investors, eg pension funds, were also considered necessary in ensuring a solid demand for securities. Finally, the market makers programme run by the Finance Ministry was said to be a useful tool for getting banks interested in securities.

On the supply side, participants highlighted the importance of having transparent and clear communication with the market; for instance, informing market participants as to what would be supplied. For this reason issuance calendars were said to be useful, as investors learned in advance about the type of instruments to be issued, their amounts and maturities. This also helped avoid market segmentation among different securities. Finally, it was said that issuers could help the pricing of securities with bond re-openings rather than issuing new securities.

## ***New financial instruments and risk management capabilities***

Have risk management tools and practices evolved rapidly enough to keep pace with the development of new financial instruments? While new instruments help complete markets and provide opportunities to hedge or increase exposure to specific risks, they also have implications for financial stability which are not fully understood. Discussion at the meeting focused on the four main pillars of risk management: *identification, quantification, mitigation and control*.<sup>5</sup>

### *Risk identification and quantification*

Participants indicated that large international banks are up to date with respect to the tools available for identifying and measuring risk and that their capacity to handle them has improved over the past few years. In fact, as discussed by Jeanneau and Tovar (2008b) in this volume, countries with more open financial systems should benefit from the transfer of know-how from such institutions. Nevertheless, it was also said that the need for transparent and liquid markets to feed risk models and the establishment of an adequate financial and legal infrastructure constitute a major challenge for risk management in the region.

### *Risk mitigation*

It was argued that financial instruments were just one way to manage risk, and that their development was sometimes related to their ability to provide a hedge or financial speculation. Participants therefore indicated that developments had to be evaluated in the context of the needs of domestic agents and the availability of alternative cost-effective ways to manage risks. For instance, a freely floating exchange rate creates the need for effective instruments and for prudential regulations to manage currency risk. Nonetheless, it was said that it was not uncommon for users to be unable to assess the risks of new instruments and that a more gradual or slower development of the market might be safer. Finally, it was

---

<sup>5</sup> It should be kept in mind that the pace at which countries introduce new financial instruments differs significantly across the region, so the implications for risk management differ from country to country.

recalled that implementing sophisticated risk management tools in the region was sometimes costly, partly because financial crises still linger in the memory of agents.

### *Risk control*

Risk control was considered as posing the greatest challenge for financial agents and regulators. In particular, regulators did not always have the capacity to assess the adequacy of risk management systems. For this reason, it was stated that tools and practices may not have developed enough to keep up with the development of financial markets. Financial instruments rapidly introduced in the developed world may be harder to digest in the EMEs. This creates challenges for risk control. There is no doubt that financial innovation provides global rating agencies with a significant advantage over local agencies which may lack the capacity to evaluate sophisticated new instruments or transactions. Recent events have shown how difficult this is, even for the major international agencies. Many participants were worried that local banks would copy sophisticated instruments developed abroad without fully understanding their functioning. Finally, some considered that risk control weaknesses were magnified by a shortage of well trained financial analysts in banks or institutional investment companies.

### **The role of foreign investors**

The presence of foreign investors in domestic bond markets has been expanding. Available statistics on debt holdings (mainly local government securities) show that foreign investment went from less than \$15 billion at the beginning of 2003 to \$200 billion by the end of 2006. This trend is likely to continue and hedge funds are likely to gain prominence. Their presence raises two main issues: (i) what form does non-resident exposure to local currency bonds take? and (ii) do foreign and domestic investors react differently in episodes of volatility (eg May–June 2006 or February–March 2007)?

It is difficult to generalise about the form in which non-resident exposures are held, because each country has different dynamics and regulations. Participants did agree that foreign participation in local debt markets offers important benefits (see also Section 3): increased risk sharing, greater liquidity, and the possibility of issuing longer maturities. For instance, it was said that in Brazil the banking system was the counterpart to net long foreign positions in exchange-traded derivatives and that banks were thus laying off duration risk to non-resident investors. This eased to some extent the concerns about the large amount of public debt being held by the local financial system. However, position-taking through derivatives was felt to be complex and often lacking in transparency. Furthermore, it was thought that these instruments might be double-edged in effect; they improve risk management but also permit greater leverage. This creates challenges not just for financial authorities but also for those trying to assess country risk and for counterparties involved in the related transactions.

Foreign investors usually take indirect or hedged exposures. However, it was considered that the possibilities for taking direct *credit exposure* to government or local securities were limited. For instance, there is no credit default swap (CDS) market for local securities. Participants considered that in Mexico there is a preliminary framework, but regulations have not allowed the market to develop fully. Although Mexico is a particular case in the region given that it is a very open market allowing foreign investors to acquire exposures to local government debt easily and to buy and sell with plenty of liquidity, it was thought to have weaknesses on the operational side and regarding withholding taxes. Participants also considered that there was no homogeneous group of foreign investors. Domestic investors are also heterogeneous and the various players have different investing horizons. Such heterogeneity entails quite diverse reactions during episodes of volatility, making it difficult to determine whether domestic investors actually behave differently to foreign ones. Some participants nevertheless argued that foreign investors may have played a stabilising role

thanks mainly to their longer investment horizons, their contribution to domestic liquidity and their capacity to help complete markets.

### **Broadening the institutional investor base**

Institutional investors have played a fundamental role in developing bond markets. As such, it is natural to ask two questions: (i) to what extent have countries succeeded in broadening the investor base?; and (ii) what has been the impact of regulations on investment in local currency bonds?

Participants indicated that it was unclear what the benchmark was for a successful experience in broadening the institutional investor base. In the region, Chile is often taken as the benchmark. There, institutional investors hold assets equivalent to almost 90% of GDP, of which 70% are held by pension funds, and the rest by insurance companies and mutual funds. Such concentration of the investor base weakens Chile's position as a benchmark. Nevertheless, it is true that mutual funds have increased their presence in the capital markets, in particular in short-term fixed income markets, while corporate bonds are mainly dominated by pension funds and life insurance companies.

Pension funds are a captive investor class for local currency bond markets. Their dominance in these markets has implications for market performance and the manner in which these markets operate. In Latin America, a large proportion of government bonds are held by institutional investors. This raises the question of whether this is the result of regulation or other factors. It appears that pension funds have not necessarily taken advantage of some recent relaxations of regulation that have allowed investment abroad.<sup>6</sup> For instance, earlier limits in Chile on cross-border investments forced pension funds to increase positions in government bonds. Once regulations were eliminated, however, positions abroad began to increase while holdings of government bonds declined. In this case, regulatory changes acted to stimulate institutional investment overseas.

### **Is there scope for a regional bond fund?**

If size limits the expansion of investment into domestic bond markets, then a regional bond fund may constitute an alternative option. A few years ago Asian central banks, in collaboration with the Bank for International Settlements (BIS), started to introduce regional bond market initiatives. Two funds have been launched: the Asian Bond Fund (ABF) 1 and ABF2. ABF2 is an initiative aimed at supporting the development of local currency bonds, creating a critical scale to set up a number of elements required for these markets to develop, such as the costly infrastructure (eg trading platform clearing services, rating agencies, etc). As to whether a similar effort to develop a regional bond fund in Latin America was desirable, participants at the meeting indicated that the financial cooperation framework in Latin America has been dominated by sub-regional development banks, mainly serving medium-sized and small economies. However, beyond these regional institutions, no one saw any scope for regional cooperation that would lead to something along the lines of ABF2.<sup>7</sup> Nevertheless, it was also clear that multilateral development banks, such as the Inter-American Development Bank (IADB) and the World Bank, have introduced initiatives to promote domestic bond markets.

---

<sup>6</sup> Nevertheless, tight regulations remain on the type of assets that pension funds are allowed to hold.

<sup>7</sup> Possibly the only regional initiative allowing something along these lines is the Latin American Reserve Fund (FLAR), an Andean effort which has recently been extended to include Costa Rica and Uruguay.

In general, it was considered that local markets in Latin America are so diverse (eg in regulation, taxation, currencies and size) that in practice it seems difficult to implement a regional initiative. However, some participants indicated that a lesson derived from the ABFs is that they forced countries to look into the peculiarities of their own national bond markets which were creating barriers for foreign investors and, therefore, it seemed that a regional effort could help in harmonising bond market practices and so stimulate foreign investment. Nonetheless, not all participants shared such view, partly because many saw such an initiative as a “drop in the bucket”, given their small size.

## **5. Implications for the transmission of monetary policy**

Monetary policy transmission mechanisms in EMEs have changed radically over the past decade: see BIS (2008) for a comprehensive review. Nowadays central banks in Latin America rely less on direct means of monetary control (eg credit ceilings, interest rate controls) and more on market-based instruments. The development of long-term debt markets is one instance of how financial markets have grown. As such, more developed and efficient financial markets are required for monetary policy to operate effectively. The linkages between financial markets and monetary policy frameworks raise an important issue: how do incomplete and imperfect financial markets influence the transmission mechanism of monetary policy? Jeanneau and Tovar (2008c) in this volume look into this matter.

### **Financial markets and the transmission mechanism**

The degree of financial market development influences the transmission of monetary policy. Two questions that arise here, therefore, are: (i) how has the development of local markets (at the short-term and long-term ends) changed the transmission mechanism of monetary policy? and (ii) what implications can be derived for inflation targeting (IT) countries?

#### ***The impact on the transmission mechanism***

Participants found it hard to disentangle the various impacts of developing financial markets on the transmission of monetary policy. Nevertheless, several views were expressed. For instance, it was said that the development of securities markets meant that monetary policy could have larger balance sheet and asset price effects than in the past. The interest rate channel has been strengthened. At the same time, the bank lending channel may have been widened and perhaps modified, as bank lending to new market segments such as households or medium-sized firms has expanded. In fact, tight constraints on credit (characteristic across the region in the past) have slowly been loosened, thus improving credit access.

In the region, monetary control by indirect means has been hampered historically by the absence of the medium- and long-term ends of the nominal yield curve. The development of domestic bond markets should therefore strengthen the interest channel. However, participants also indicated that for some of the smaller economies in the region (eg Bolivia, Costa Rica, or Uruguay) the challenge is to make this operational.

Fixed or semi-fixed exchange rates no longer dominate monetary regimes. A de-dollarisation process in some countries has helped this trend. In addition, the adoption of IT combined with more flexible exchange regimes has reduced the information contained in the exchange rate regarding inflation expectations. Exchange rate appreciation when a central bank raises interest rates more than in major financial centres can create monetary policy dilemmas and lead to some difficulty in communicating that monetary policy has no commitment to the

exchange rate. Excess liquidity globally has complicated the conduct of monetary policy in several economies.

### ***Implications for inflation targeting***

Participants saw in the progress of domestic financial markets a positive development for IT countries. These markets provide a transparent and inexpensive mechanism for the central bank to enforce its interest rate decisions through open market operations based on repurchase agreements on public debt securities. The expansion of the yield curve was also said to provide a more reliable tool for extracting agents' expectations regarding policy decisions. Furthermore, it was agreed that anchoring expectations is essential for the success of IT and that this requires a public debt market.

However, difficulties in managing IT were also highlighted. In particular, these came about when central banks incorporated financial stability considerations in a context in which the transmission mechanism is not fully operational and/or in which financial markets are underdeveloped. Some reasons adduced for this were: (i) public debt market considerations may have to be considered in taking monetary policy decisions rather than just simply focusing the discussion on meeting the inflation target; (ii) bond markets may also alter or eliminate the transmission of monetary policy, particularly if they allow banks to manage their portfolios to minimise the impact of policy rate changes: for instance, in 2006–2007 in Colombia banks were able to bypass central bank interest rate increases; after a 225 bps increase in policy rates, credit market rates had remained virtually unchanged; finally, (iii) policy rates may have a greater impact on sensitive markets such as the housing market (which in turn is also more sensitive to sovereign spreads).

In other countries with more developed bond markets (eg Mexico), the challenges have been different. The good degree of liquidity along the yield curve up to 20 years has allowed the central bank to begin extracting the information contained in the yield curve and to analyse its implications. However, as in developed countries, puzzles have emerged, such as the well known US "conundrum". Indeed, it is hard to understand the low levels of interest rates at the long end of the curve. What does this imply? Well anchored inflation expectations? Weak economic prospects? Or is the answer more technical?

### **Central banks, finance ministries and bond markets**

What role do central banks play in developing bond markets? In particular, how far can central bank actions aimed at improving liquidity and transparency of short-term money markets contribute to the development of bond markets? Also, given the prominent role of finance ministries in developing financial markets, how should they coordinate debt management strategies with central banks (eg regarding maturity and liquidity)?

Central banks can play an essential role in helping develop bond markets, for instance, by helping create markets (either in nominal or indexed terms), or building up liquidity eg via repo markets. However, many central banks in the region have found it difficult to develop repo markets, partly as a result of excess liquidity or because commercial banks have sought to avoid the stigma of borrowing from the central bank, a problem that can be particularly severe in countries with a history of crisis. In general, it appears that developing such markets will require a greater effort on the side of central banks, such as going down to issues related to the regulation of the payment system.

A good dialogue between central banks, finance ministries and market participants was considered essential for developing domestic financial markets; in particular, discussing public debt management plans with central banks and getting their feedback. However, it was also stressed that functions must be well defined among these institutions and, hopefully, separated.

## 6. Implications for financial stability

Has capital market development improved the stability of the economies in the region? Acevedo et al's article in this volume asks how changes in the currency composition of public debt have affected the nature of financial risk in a number of EMEs, including Brazil, Colombia and Uruguay. They find that given the exchange rate appreciation observed in recent years, debt ratios would have been smaller had there been no changes in the composition of public debt structures. This is illustrative of how governments in the region (and broadly speaking in EMEs) have taken advantage of the benign international environment to transform debt structures even at the expense of such short-term costs. The authors also perform counterfactual exercises for financial turbulence scenarios (similar to those seen in recent crisis episodes) finding reductions in the debt vulnerability of these economies, even once the short-term costs associated with the transformation of debt structures are taken into account. However, such reductions are not uniform: while gains are notorious for Brazil, where debt structures have been biased toward foreign currency denominated debt, they are less so for Colombia or Uruguay. Overall the paper highlights that changing the currency composition of debt requires balancing possible short-term costs with long-term gains arising from a structure less dependent on foreign currency debt.

Participants agreed that financial stability had improved as the mechanisms amplifying the effects of exchange rate fluctuations on balance sheets had been mitigated eg currency mismatches (see evidence in Jeanneau and Tovar (2008b)). However, concerns were raised regarding the transitory or permanent features of the development of domestic markets. Others also warned that markets may disappear at times of stress.

Another issue highlighted was that the impact of capital market integration on financial stability may depend on the efficiency with which the market allocates resources and on the instrument availability for distributing risk. Therefore, weaknesses in these areas were thought to increase vulnerability to sudden shifts in capital flows.

Dual objectives of price stability and financial stability were also considered an area of tension and an obstacle to a free floating exchange rate. In this regard, participants indicated that restricting exchange fluctuations should be seen not as a countercyclical monetary policy measure but rather as an element of risk management in a context of incomplete markets that leads to excessive risk taking. In such a context, central bank measures dealing with capital flows, such as intervening in the foreign exchange (FX) market, would be justified. However, there was no consensus on how to determine the correct strategy for FX intervention. For instance, some said the focus should be on the real rather than on the nominal exchange rate, that the expected time horizon of capital flows should be taken into account and/or the capacity to sterilise interventions without compromising the inflation target had to be assessed. Nevertheless, the arguments supporting active intervention in FX markets were not shared by all, mainly due to its counterproductive side effects. Those on this side of the debate indicated that FX interventions often led to one-sided bets, thus fuelling more capital inflows and exchange rate pressures. For this reason, by placing two-sided bets, freely floating regimes were said to be superior alternatives, which endogenously trigger stabilising mechanisms to avoid snowball effects on exchange rates or capital flows as seen in the past. Another argument against interventions was that an implicit guarantee for stability often creates an implicit one for bailing out investors in bad times, thus distorting the incentives for developing adequate risk management instruments. As discussed in Section 2, the lack of agreement on exchange rate management seemed to be related to the fact that, for some participants, exchange rates play a dual role: for financial stability and for the competitiveness of the real economy, while for others, the focus of monetary policy is exclusively price stability. Nonetheless, most agreed that creating the incentives for financial markets to develop risk management instruments is fundamental.

## 7. Vulnerabilities and remaining challenges

The current favourable financing conditions for Latin America are partly the result of a combination of high commodity prices and a very benign international financial environment. The belief among most participants that the current external environment was unsustainable led to cautious views about the medium-term prospects for the region, in particular given that a scenario like this was last seen in the 1970s and ended up in a boom-bust cycle. Certainly, the extent to which one should be concerned about a bust in the region is unclear. For sure, global financial conditions have been changing recently, thus key questions that remain unanswered are: (i) how the crisis that began in the US subprime market will unfold; and (ii) how EMEs, and particularly Latin America, would adjust in the face of a major correction in financial markets.

Despite the uncertainties surrounding the global financial system, it appears that Latin American economies are now more resilient to adverse conditions than in the past. As summarised here, the development of bond markets, debt management tools and practices, and regulatory policies are all elements supporting such optimism. Most countries in the region are also progressing in terms of fiscal, monetary and exchange rate policies. Nevertheless, policy makers must continue to be alert for possible financial weaknesses, as many do remain. For this reason, meeting participants stressed the need to avoid any complacency with regard to the progress made so far. Financial markets still need to be further developed and strengthened.

## References

Acevedo, P, E Alberola and C Broto (2008): “Local debt expansion and vulnerability reduction: an assessment of six crises-prone countries”, in this volume.

Ananchotikul, S and B Eichengreen (2008): “Plumbing for Latin American capital markets”, in this volume.

Armas, A, A Ize and E Levy-Yeyati (2006): *Financial dollarization: the policy agenda*, Palgrave Macmillan [In Spanish: *Dolarización Financiera: la Agenda de Política*, Banco Central de Reserva del Peru].

Bank for International Settlements (2007): “*Financial stability and local currency bond markets*”, *CGFS Publications*, no 28.

——— (2008): “Transmission mechanisms for monetary policy in emerging market economies”, *BIS Papers Series*, no 35.

Jeanneau, S and C Tovar (2008a): “Latin America’s local currency bond markets: an overview”, in this volume.

——— (2008b): “Financial stability implications of local currency bond markets: an overview of the risks”, in this volume.

——— (2008c): “Domestic securities markets and monetary policy in Latin America: overview and implications”, in this volume.

Ocampo, J and R Vos (2008): “Policy space and the changing paradigm in conducting macroeconomic policies in developing countries”, in this volume.

Quispe, M and D Vilan (2008): “Financing trends in Latin America”, in this volume.

Scatigna, M and C Tovar (2007): “Securitisation in Latin America”, *BIS Quarterly Review*, September, pp 71–82.

# Financing trends in Latin America<sup>1</sup>

Myriam Quispe Agnoli<sup>2</sup> and Diego Vilán<sup>3</sup>

## 1. Introduction: Latin American financial markets in historical perspective

Financial markets expanded rapidly beginning in the early 1970s in the world's largest, most developed economies. According to the World Bank, financial markets underwent such an expansion that the combination of bank credit, stock market capitalisation and private bonds outstanding for G7 countries reached on average approximately 250% of GDP in 2000, compared to only 75% in 1970.

We can distinguish two stages of global financial innovation during the period 1970–2005. The first of these waves can be traced back to the demise of the Bretton Woods system in 1971 and the oil shocks of 1973 and 1979. The disintegration of the Bretton Woods arrangement of fixed exchange rates allowed countries to open up to greater capital mobility, while the surge in oil prices provided markets with an influx of new funds. At the same time, capital market activity became concentrated in a few major international financial centres, mainly Frankfurt, London, New York and Tokyo.

Before then, most emerging markets, including those in Latin America, imposed tight capital controls on their financial sectors. Domestic capital markets were predominately bank-based and securities markets were unimportant and illiquid. Governments heavily regulated interest rates, intervened in the operation of financial institutions and interfered in the allocation of bank credit. As such, most of the newly available funds were used by international banks to finance public sector borrowing in emerging markets, notably in Latin America.

Sovereign lending in the 1970s and early 1980s played an instrumental part in the debt crisis that began in Mexico in 1982. In an attempt to solve this crisis, the George H.W. Bush administration devised and implemented the Brady Plan. This initiative was aimed at restructuring distressed commercial bank loans into liquid, tradable securities, but it also created a market for sovereign emerging market bonds. With the establishment of this new market in 1989, investor confidence in developing countries began to recover, and soon the international financial community would be ready to embrace Latin America again.

The second wave of financial innovation started in the early 1990s. At the heart of this new wave of financial development were important advances in communication technologies that brought about faster, more efficient transmission of data across the globe. These technological innovations further influenced global trading by reducing transaction costs, and this in turn increased market liquidity.

Like other developing regions, Latin America tried in several ways to attract a share of the newly available capital in international markets, including by introducing pro-market reforms and liberalising its financial systems. As part of this process, governments and private agents

---

<sup>1</sup> Document prepared for the BIS-FRB Atlanta meeting “Recent financing trends in Latin America: a bumpy ride towards stability”. The views expressed in this work are those of the authors and do not necessarily reflect the views of the Federal Reserve Bank of Atlanta or the Federal Reserve System.

<sup>2</sup> Federal Reserve Bank of Atlanta, myriam.quispe-agnoli@atl.frb.org.

<sup>3</sup> Federal Reserve Bank of Atlanta, diego.vilan@duke.edu

sought to raise capital in overseas markets, and foreign investors were permitted to invest in domestic assets. The liberalisation of financial systems also meant that international financial institutions established their presence in developing nations, either by purchasing local businesses or by establishing themselves as local subsidiaries.

Another method used to attract foreign capital was through the privatisation of public enterprises. The privatisation proceeds were quite substantial in Latin America and throughout the developing world, rising from US\$ 2.6 billion in 1988 to US\$ 25.4 billion in 1996, according to World Bank estimates. In addition, lured by the potential benefits of developing domestic capital markets, governments also passed new legislation aimed at creating the proper market infrastructure and institutions for capital markets to flourish. In particular, countries created domestic securities and exchange commissions, enhanced their regulatory and supervisory framework and improved the operational aspects of how markets operated, including creating centralised exchanges, securities clearance and settlement systems.

Latin American countries also tried to improve the overall climate by pursuing macroeconomic stabilisation policies, creating better business environments and improving economic fundamentals. In addition, they passed new laws and regulations intended to protect the rights of investors.

During the 1990s the composition of capital flows into Latin America changed significantly relative to what it was in the 1970s. Flows to public investment decreased more than 50%, with flows into the private sector becoming the prime destination of foreign investments. Both portfolio flows and foreign direct investment (FDI) grew continuously throughout the decade. This later wave in financial globalisation also brought an internationalisation of financial services. This trend is partially explained by the greater presence of international financial intermediaries, but also by the fact that issuance and trading of local securities continued to migrate to international markets.

At the end of the 1990s, Latin American political and economic uncertainty contributed to the decline in capital flows. Behind this economic uncertainty were the devaluation of the Brazilian real, which affected the competitiveness of Argentina and other Southern Common Market (MERCOSUR) economies; the banking and currency crisis in Ecuador; and the economic and financial crises in Argentina and Uruguay. In addition, economic reform fatigue and a general discontent with the failure of the reform process to improve living standards contributed to political turmoil in the region.

Nevertheless, by 2003, an increasingly stable Latin America – one that coped with crises without a contagion effect – created a more attractive environment for the return of capital flows. International investors liked the narrowing spreads that resulted from macroeconomic stability and fiscal discipline despite economic turmoil. Moreover, Latin American economies remained steady even during 2005 and 2006, which were election years in most countries in the region and, consequently, also times of political “noise”. These economies continued to experience macroeconomic stability in a positive external environment of high commodity prices and high liquidity.

Overall, while capital markets in many developed countries witnessed a boom over the last decade, the picture is more blurred for the emerging economies in Latin America, which have a high level of heterogeneity across nations. The domestic capital markets of some countries did not experience any growth, and for those that did, their growth was not nearly as robust as that in the advanced economies. Nevertheless, interesting differences arise when comparing the level of development of domestic markets across different emerging regions, ie across East Asia, Eastern Europe and Latin America.

The most important developments experienced by Latin American financial markets during the period 1990–2005 are documented below. These sections focus on three of the four main components of financial markets in Latin America: equity markets (both portfolio equity investments and FDI), the domestic banking sector and the more recent phenomenon of

remittances. Each major component is analysed in an individual section. The development of the fourth component, bond markets, is covered extensively in a paper in this volume by Jeanneau and Tovar.

Additionally, in an effort to understand what distinguishes this region from other emerging economies, we compare, whenever possible, the performance of Latin America with other developing regions worldwide. It should be noted that unless otherwise indicated, when we refer to “Latin America” we are referring specifically to the seven largest markets in the region, or LAC7: Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.<sup>4</sup>

## 2. Equity markets

As mentioned above, equity markets comprise mainly portfolio equity flows and FDI. The former involves the acquisition of company shares, usually through stock markets, without gaining effective control of the firm. The latter involves the forging of longer-term relationships with firms, a process that usually includes the actual attainment of some degree of control of the enterprise. Since both components evolved differently during 1990–2005, we analyse each component separately.

### 2.1 Portfolio equity flows and stock market development in Latin America

Figure 1 displays average values of different measures of stock market development for Latin America, emerging Asia and emerging Europe for the years 1990–2005. As the figure shows, stock markets in Latin America have grown considerably in recent decades. The average domestic stock market capitalisation in terms of GDP in Latin America more than tripled between 1990 and 2005. Moreover, value traded in domestic stock markets (a measure of market liquidity) also increased significantly during this period, from an average of 2% of GDP in 1990 to 8.5% in 2005. On average, Latin American capital markets have not only increased in size but have also become deeper during the last 15 years.

Regional differences are also quite informative. Chile’s stock market registered the greatest regional capitalisation, with an impressive 118% of GDP, followed by Brazil’s at 59.6% and Peru’s at 45.4%. Brazil is the most liquid of these markets, with a value traded well above the average, at 19.3% of GDP, followed by Chile at 16.3% and Argentina at 8.9%.

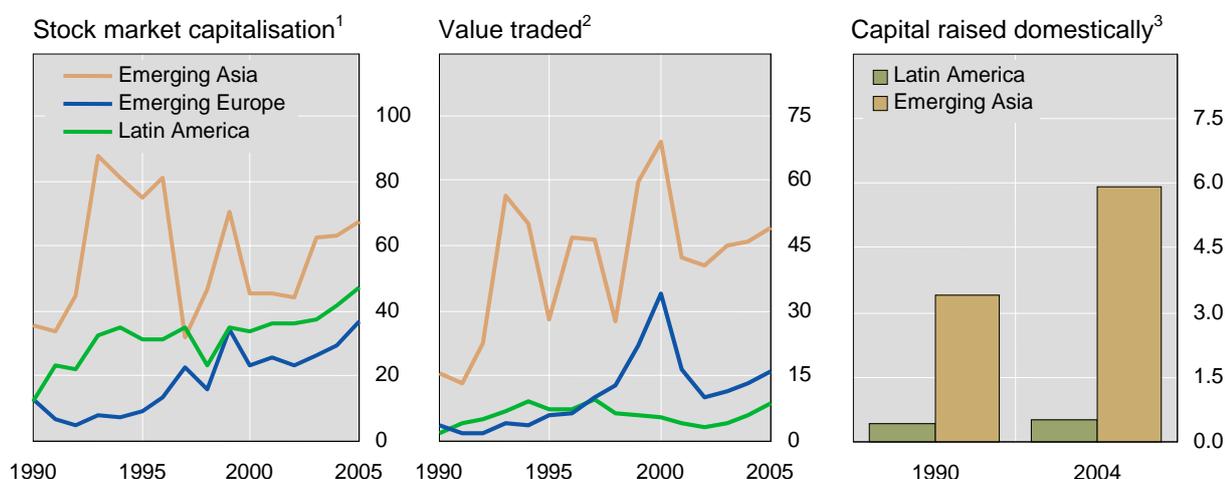
Despite strong growth, stock markets in Latin America remain underdeveloped compared to some emerging markets. In terms of stock market capitalisation, at the end of 2005 the region was below the average 67.2% of GDP registered by emerging Asia, but greater than emerging Europe’s 36%. However, when we look at the evolution of these markets, we can see how Latin America and emerging Europe have been catching up with emerging Asia, consistently delivering higher growth rates for the last five years.

In terms of liquidity, Latin American economies seem to be facing harsher constraints than other developing markets. In this sense, both emerging Europe and Asia far surpassed Latin America, with an average traded value of 16.4% and 49.2% of GDP, respectively. The most liquid markets in Europe are Turkey and Hungary, while in Asia the front-runners are South Korea and India.

---

<sup>4</sup> Similarly, “emerging Europe” refers to the economies of Croatia, Cyprus, Hungary, Poland, Turkey, Slovakia and the Russian Federation; and “emerging Asia” includes the economies of China, India, Indonesia, South Korea, Malaysia, the Philippines and Thailand.

Figure 1  
**Emerging capital markets development<sup>1</sup>**  
 As a percentage of GDP



Emerging Asia refers to the economies of China, India, Indonesia, Malaysia, the Philippines, South Korea and Thailand; emerging Europe refers to Croatia, Cyprus, Hungary, Poland, the Russian Federation, Slovakia and Turkey; Latin America refers to Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.

<sup>1</sup> Shares outstanding valued at market prices. <sup>2</sup> Value of shares traded during the period; the indicator complements the market capitalisation ratio by showing whether market size is matched by trading. <sup>3</sup> Value of funds raised by domestic companies in their local capital markets.

Source: World Bank (2007), *World Development Indicators*.

The amount of capital raised domestically as a percentage of GDP is yet another indicator commonly used to assess the development of domestic capital markets. On this account, Latin America has, unfortunately, not made significant strides, registering a rise of 0.4% of GDP in 1990 and 0.5% of GDP in 2004. As Figure 1 shows, the difference between Latin America and emerging Asia might be explained by the contrasting deepness in capital markets in these regions.

The average number of firms listed in domestic stock markets can also be used to gauge the possibilities available for local businesses to tap local sources of funding. In this case, the evolution, rather than a point estimate, is the more relevant measure. Unfortunately, in Latin America, the average number of listed companies has actually decreased, from 232 in 1990 to 176 in 2006. This seems to be the regional trend, with the exception of Chile and Colombia, where the number of listed firms increased. This speaks to the internationalisation of financial services, as well as the preference of Latin American business owners for either foreign capital markets or alternative sources of finance.

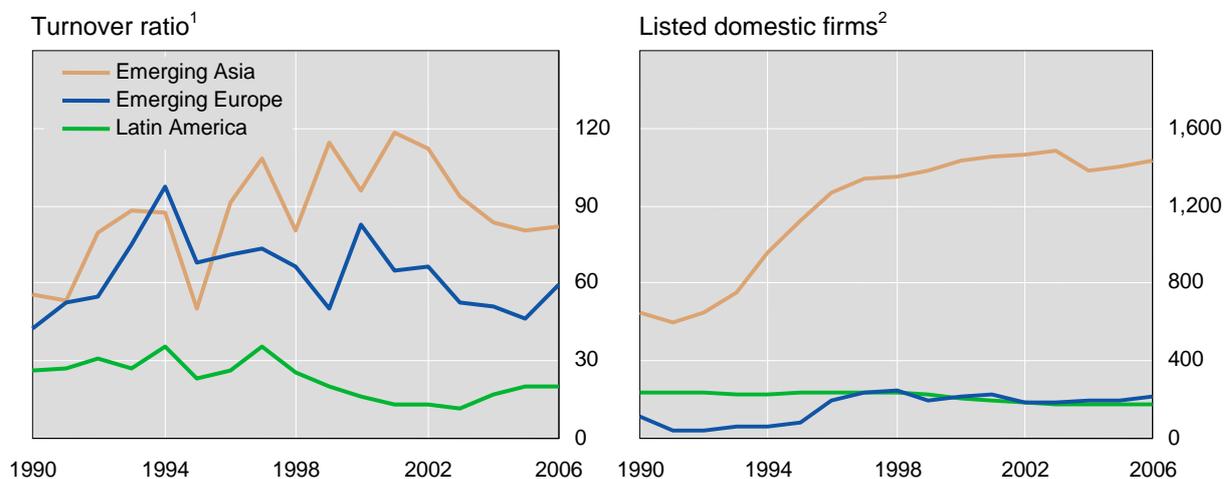
Finally, an additional indicator of stock market development which relates to its efficiency is the turnover ratio (see Figure 2). This indicator consists of the value of shares traded as a percentage of market capitalisation. A high turnover ratio implies low transaction costs, a measure that to some extent is a proxy for the degree of maturity and sophistication acquired by a particular capital market. On this account, we find that Latin America has, on average, worsened its situation, with a turnover ratio of approximately 26 in 1990 and 20 in 2006. There are regional exceptions, as in Brazil, Mexico, Chile and Colombia, which all show positive improvements during this period.

As for the other emerging markets, both Asia and Europe reflect different realities (see Figure 2). In terms of efficiency, both regions deliver much higher turnover ratios. Emerging Asia improved from 55.6% of GDP in 1990 to 82.1% of GDP in 2006, and emerging Europe went from 42.4% of GDP to 59.22%. In Asia in 2006, South Korea at 173.6% and China at

136.4% were well above the average, while in Europe, the front-runners were again Turkey, at 143.1%, and Hungary, at 88.1%.

Figure 2

### Turnover and listed firms in emerging markets



For a list of countries included in each region see Figure 1.

<sup>1</sup> Value of shares traded as a percentage of average market capitalisation. <sup>2</sup> Incorporated companies at the end of each year; does not include investment companies, mutual funds or collective investment vehicles.

Source: World Bank (2007), *World Development Indicators*.

The average number of listed companies also shows much different behaviour than that in Latin America. Specifically, the average number of companies in emerging Asia has more than doubled from 1990 to 2006, with India, South Korea and China leading the way (4,796, 1,694 and 1,440 companies, respectively; see Figure 2). As for emerging Europe, the growth rate has been similar, with the average number of companies almost doubling from 1990 to 2006. Turkey, Poland and the Russian Federation registered the biggest increases, with 314, 309 and 267 listed firms, respectively.

In 1993 portfolio equity flows represented 39% of total capital flows to Latin America. This share shrank in the following years, reaching 7.6% in 2005. The continuous fall of portfolio equity flows in Latin America can be explained by geopolitical uncertainty since 2001, concerns about global economic activity and higher returns in international debt than in stock markets. Moreover, in 2002, political and economic turmoil, mainly in Brazil and Argentina, drove equity investors to other markets. Portfolio equity flows increased to US\$ 12 billion in 2005, the best year in this century so far, owing to liquidity in international markets and narrow spreads in Latin American countries.

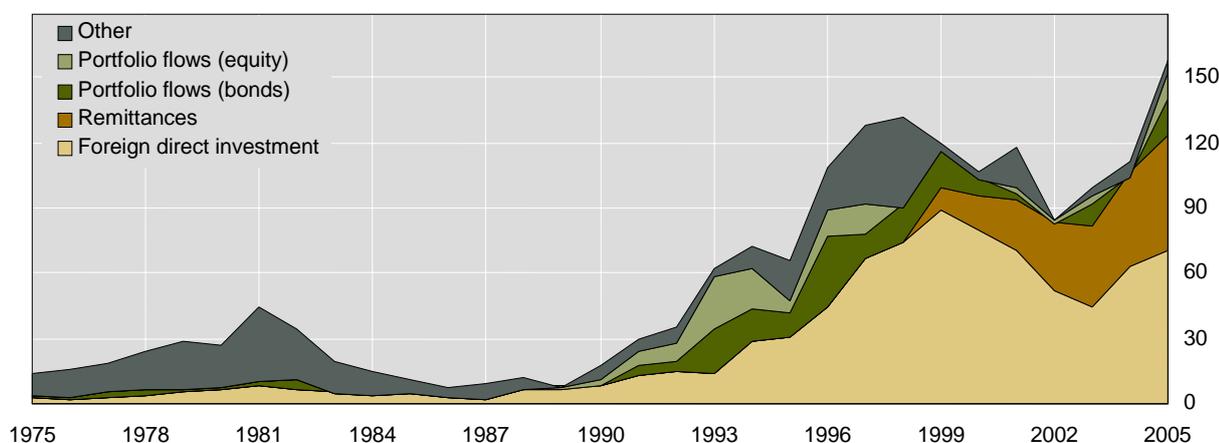
Despite the economic and institutional reforms in Latin America, stock markets have a long way to go to reach the development of other emerging markets. According to de la Torre et al (2006), to flourish, capital markets require a “regulatory and supervisory framework for securities markets, accounting and disclosure standards, corporate governance practices, and securities trading custody, clearing, and settlement systems” (p. 13). Additional factors limiting the development of deep financial markets could be the small size of Latin American economies, lack of risk diversification opportunities, presence of weak currencies and prevalence of systemic risk. Finally, the development of stock markets takes place within the context of global market integration, leading to a revision of the concept of financial development, where “financial development is characterised as the sustainable deepening and broadening of access to financial services regardless of whether such services are

provided at home or abroad” (p. 15). In these terms, domestic and international markets would be working in a complementary fashion to support the financing of the economy.

## 2.2 Foreign direct investment

Foreign direct investment (FDI) has become the dominant source of private capital flows to emerging markets internationally, and Latin America is no exception. Currently, as Figure 3 shows, FDI accounts for approximately two thirds of all financial flows to the region. Not surprisingly, FDI grew more than threefold, soaring from approximately 1% to 3.8% of GDP during 1990–2005.

Figure 3  
**Flow of funds to Latin America**  
 In billions of US dollars



For a list of countries included in each region see Figure 1.

Sources: World Bank (2007), *World Development Indicators*; ECLAC; IADB.

The decreasing relative importance of portfolio equity and bonds flows is regarded as a mostly positive development, since FDI is presumed to be a source of capital that is more stable and less prone to reversals than portfolio equity flows. In addition, this type of investment is also believed to bring with it many of the indirect benefits of financial globalisation, such as transfer of technology and managerial expertise.

Regional differences within Latin America provide some insights into how foreign investors have been allocating their capital. Relative to the size of their economies, the three biggest Latin American recipients of FDI in 2005 were Colombia (8.48%), Chile (5.78%) and Ecuador (4.51%). Most of these figures reflect investments in these countries' commodity and infrastructure sectors.

FDI experienced a similar trend in other emerging regions during 1990–2005. In emerging Asia, FDI has on average grown from 1.67% to 2.01% of GDP. The biggest FDI recipients in 2005 as a percentage of GDP were China (3.54%), Malaysia (3.04%) and Thailand (2.56%). In emerging Europe, FDI soared from an average of 1% of GDP in 1990 to 3.74% in 2005. Hungary, Croatia and Slovakia led the way, with FDI accounting for 5.89%, 4.57% and 4.11% of GDP, respectively, in 2005.

During the privatisation and liberalisation processes in the 1990s, foreign investors established their presence in the region, buying companies in such industries as telecommunications, power, water and sanitation, oil and natural gas and steel. However, since the early 2000s this trend has reversed. Some Latin American firms, after consolidating

their position in their home markets, acquired companies in the region when foreign firms downsized or closed their operations; this is what happened with Mexico's Telmex and Chile's Falabella in the retail sector. Other Latin American firms concentrated on acquiring companies in their home countries, as did Brazil's Banco Itaú. This local expansion shows not only the strength and competitiveness built by firms during the liberalisation process but also the risk of a takeover by a developed transnational company (WIR 2006).

High commodity prices and changes in regulations may affect the future of FDI. Owing to improvements in current accounts, currency appreciation might adversely affect business prospects for FDI in export-oriented activities. Moreover, high oil prices have led some countries, such as Bolivia, Ecuador and Venezuela, to increase state intervention in this sector. In other countries, high commodity prices have also increased state-owned companies' revenues, reducing their dependence on financing from foreign investors and leading to policy changes deterring FDI in these sectors. However, soaring prices and global and regional growth prospects are outweighing these adverse effects.

### 3. Domestic banking system

Banks have traditionally played a very important role in the financing of economic activity in Latin America. The reasons for this prominent position could be the relatively later development of the bond and stock markets, government intervention and their comparative advantage in risk diversification due to information processing. Although banks share several common characteristics, they are also heterogeneous across the region in terms of their development.<sup>5</sup>

Since the 1990s, the banking system has been through a financial liberalisation process that involved its deregulation, regional openness to foreign bank entry and the decline of government intervention due to privatisation. Despite this financial reform, Latin American banks are still vulnerable to macroeconomic and external shocks and to new risks such as market, credit and liquidity risks.<sup>6</sup> Mexico in 1994, Ecuador in 1999, Argentina in 2001, Uruguay in 2002 and the Dominican Republic in 2003 faced banking crises, the sources of which were macroeconomic or external shocks. Today, however, current favourable conditions in international markets and stable macroeconomic policies are providing excellent opportunities for the growth and development of the banking system in Latin America. If banks take advantage of these opportunities, they will be better prepared to face and mitigate future domestic and external shocks.

Despite the dominance of banks, the size of the banking system in Latin America is relatively small when compared to emerging Asia and Europe. Figure 4, which looks at liquid liabilities as a percentage of GDP – an indicator of the relative size of the banking system<sup>7</sup> – illustrates that the banking system in Latin America is approximately 35% of GDP, underscoring its lack of depth when compared to shares of 90% and 50% of emerging Asia's and emerging Europe's GDP, respectively.

Brazil's banking system expanded from 2000 to 2005; recent structural changes and improvements in the macroeconomic environment have helped to deepen credit penetration

---

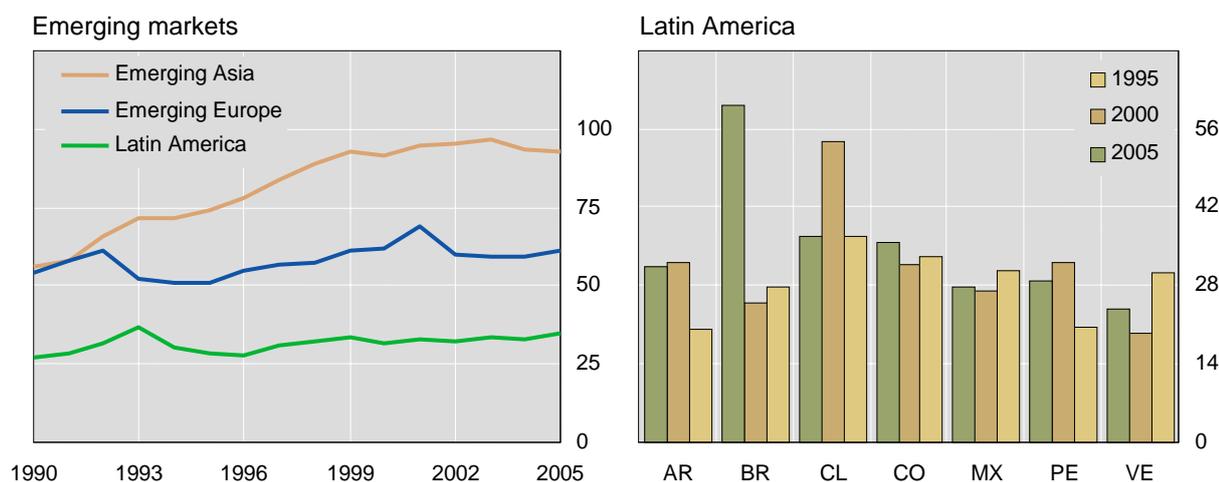
<sup>5</sup> Jeanneau (2007) points out that some of these differences could be based on the financial crises faced in previous years.

<sup>6</sup> For a discussion of the evolution of risks in Latin American banking systems see Tovar (2007).

<sup>7</sup> This factor is actually an indicator of the size of the financial system, but given that banks are the most important component, we use it as a proxy.

(see Figure 4). Despite the size of their economies, the liquidity share in GDP of banking systems in Mexico and Argentina are at the levels of those in Colombia and Peru, which could have resulted from the long-lasting negative impact of the financial crises in 1994 and 2002.

Figure 4  
**Banking system size in emerging markets**  
 Liquid liabilities as a percentage of GDP



For a list of countries included in each region see Figure 1.

AR = Argentina; BR = Brazil; CL = Chile; CO = Colombia; PE = Peru; VE = Venezuela.

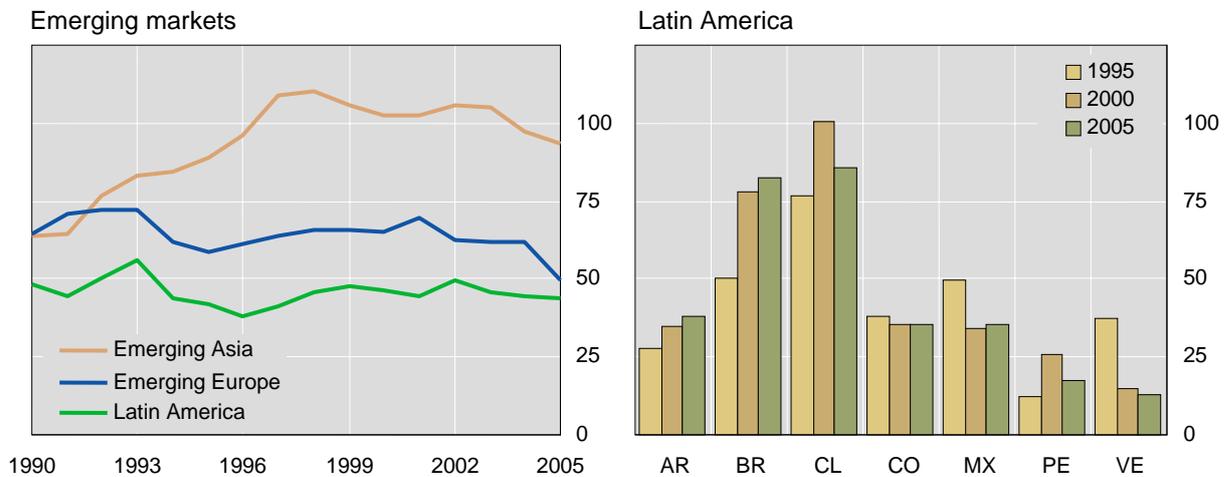
Source: World Bank (2007), *World Development Indicators*.

Another indicator of the depth of the banking system is domestic credit provided by the banking sector as a percentage of GDP (see Figure 5). The financial intermediation activity of Latin American banks has remained unchanged over the last 10 years, while in emerging Asia and Europe, the ratios of domestic credit provided by banks have improved, highlighting a deeper banking sector in these regions. A common denominator among all these countries is the small decline of this ratio from 2000 to 2005. This decrease might be explained by the development of alternative sources of financing, such as stocks and bonds, or by external financing sources.

In Latin America, Brazil and Chile are the countries with the higher domestic credit shares as a percentage of GDP. However, they show different trajectories (see Figure 5). Brazil had an increase from 2000 to 2005, while Chile experienced a decrease. Argentina, Colombia and Mexico present similar levels of domestic credit provided by the banking sector, but these levels are lower than 40% of GDP. Despite strong economic growth in Latin America, there is a decline in domestic credit provided by the banking sector, which could be the result of the slow pace in banking activity to support growing economic activity and the presence of alternative sources of financing. This might be the case for Chile and Peru, where domestic capital markets, FDI and financing from abroad might be crowding out the banking system.

Figure 6 shows the difference between the lending rate and the deposit rate. Latin America has had an average spread around 10% higher than that in emerging Asia and emerging Europe. This difference might be the result of more competitive banking systems in emerging Asia and Europe and the higher concentration and market power of Latin American banks.

Figure 5  
**Domestic credit provided by the banking system in emerging markets**  
 As a percentage of GDP

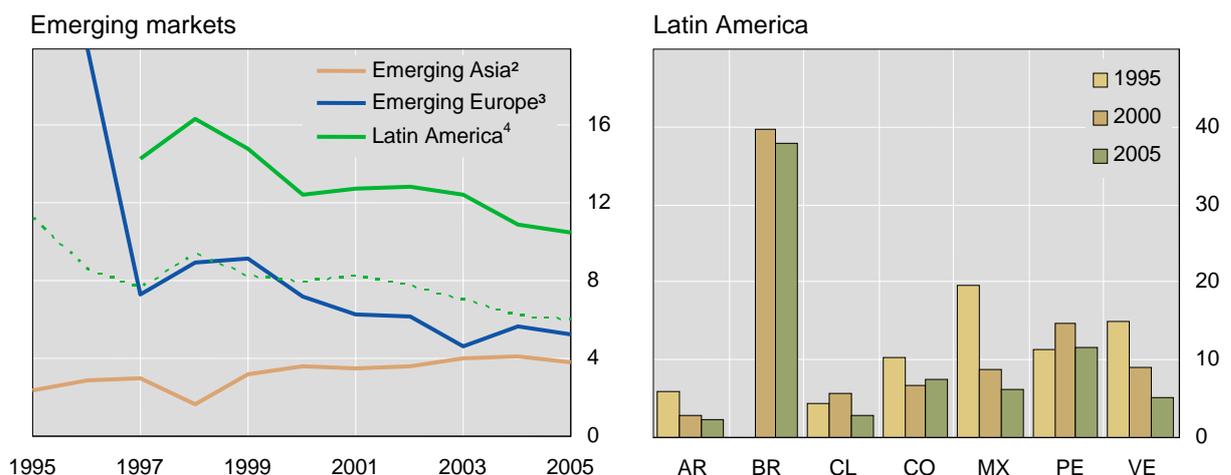


For a list of countries included see Figures 1 and 4.

Source: World Bank (2007), *World Development Indicators*.

Figure 6 looks at the Latin American countries and shows that the large average spread in this region is driven by the spread of Brazilian banks, revealing the greater degree of government involvement in the financial system. Latin America's average interest rate spread for 2000 and 2005 without Brazil would be approximately 8% and 6%, respectively, which is closer to the levels of other emerging regions. Peru is another country with a spread above the Latin American average, showing the conservative approach of Peru's banks.

Figure 6  
**Interest rate spreads<sup>1</sup>**  
 In per cent



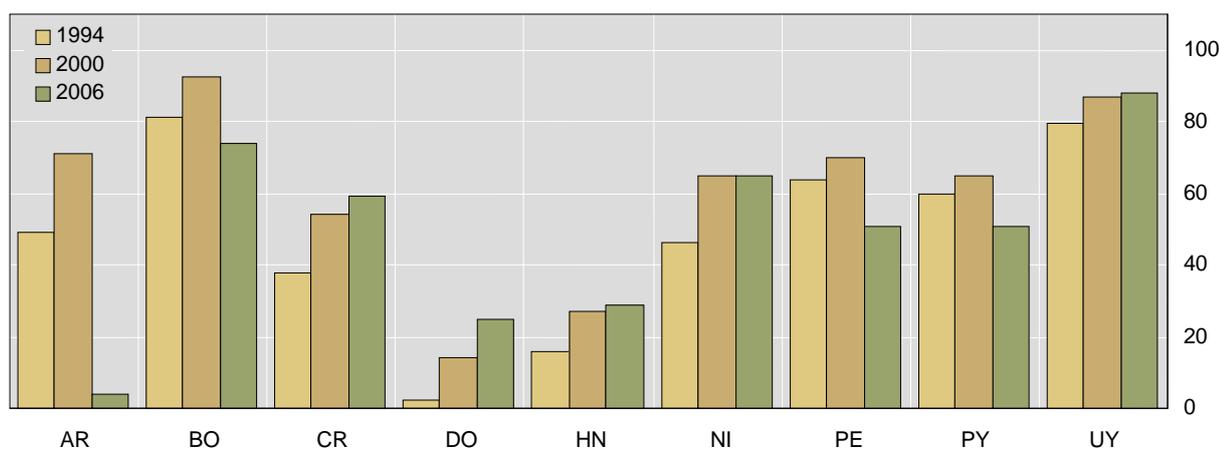
For a list of countries included see Figures 1 and 4.

<sup>1</sup> Difference between lending and deposit rates. <sup>2</sup> Excludes India. <sup>3</sup> Excludes Turkey. <sup>4</sup> The thin line represents the average for Latin America excluding Brazil.

Source: World Bank (2007), *World Development Indicators*.

The presence of deposits and/or loans in foreign currency or dollarisation in bank balance sheets is another characteristic shared by the banking sectors of many developing countries. In Latin America, dollarisation started as a response to high inflation rates and consequently the loss of purchasing power of bank deposits. Figure 7 shows some Latin American countries with dollarisation ratios above 40% of the total banking deposits. We can also see that the dollarisation process has slowed in some countries or reversed in others, as in Bolivia, Paraguay and Peru. This reversal has been in response to a continual appreciation of the domestic currency and to several measures to encourage deposits in domestic currency, such as a tax on financial transactions, denomination of goods and services in domestic currency, and so forth.

Figure 7  
Dollarisation in Latin America<sup>1</sup>



AR = Argentina; BO = Bolivia; CR = Costa Rica; DO = Dominican Republic; HN = Honduras; NI = Nicaragua; PE = Peru; PY = Paraguay; UY = Uruguay.

<sup>1</sup> Foreign currency deposits as a percentage of total deposits in the banking system.

Source: Central banks.

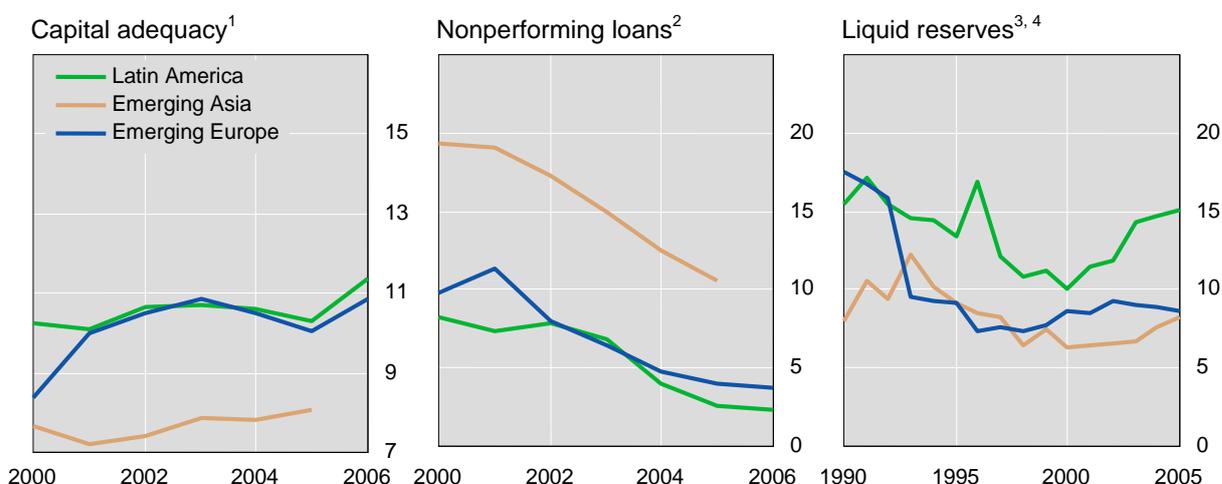
Bank performance in emerging markets has improved in recent years. Figure 8 shows the capital adequacy ratio defined as the bank capital to bank assets ratio, indicating that banks are complying with regulations and are on average approximating Basel requirements. In Latin America, capital adequacy ratios range from 7% in Chile to 13% in Argentina, but in most countries are between 9 and 10%.

Regarding asset quality, Figure 8 shows nonperforming bank loans as a percentage of total gross loans. In all regions, asset quality has improved, although some economies in emerging Asia still face an overhang of bad loans, making them vulnerable to economic downturns. Latin American banks have been allocating credit in safer loans, going along with declines in delinquency rates.

Figure 8 shows the ratio of bank liquid reserves to bank assets for emerging areas. Here, emerging Asia and Europe present lower ratios than those in Latin America. Higher ratios in Latin American banks are driven by higher liquid reserves held by dollarised economies, such as Peru and Uruguay, as well as by countries with high political uncertainty, such as Venezuela. In addition, this position of higher liquidity could be the result of inflows of currency due to high commodity prices that banks do not want to internalise in the economy. It is important to mention that Argentine banks have tripled their ratios during this period. This increase could be a double-edged sword. On the one hand, banks are prepared to face times of uncertainty and high demand for deposits. On the other hand, there is a cost (and inefficiency) to keeping these liquid reserves.

Figure 8

### Bank system indicators



For a list of countries included in each region see Figure 1.

<sup>1</sup> Capital-to-assets ratio, in per cent. <sup>2</sup> As a percentage of total gross loans. <sup>3</sup> Liquid reserves to assets ratio, in per cent. <sup>4</sup> Excludes India from the regional classification.

Source: World Bank (2007), *World Development Indicators*.

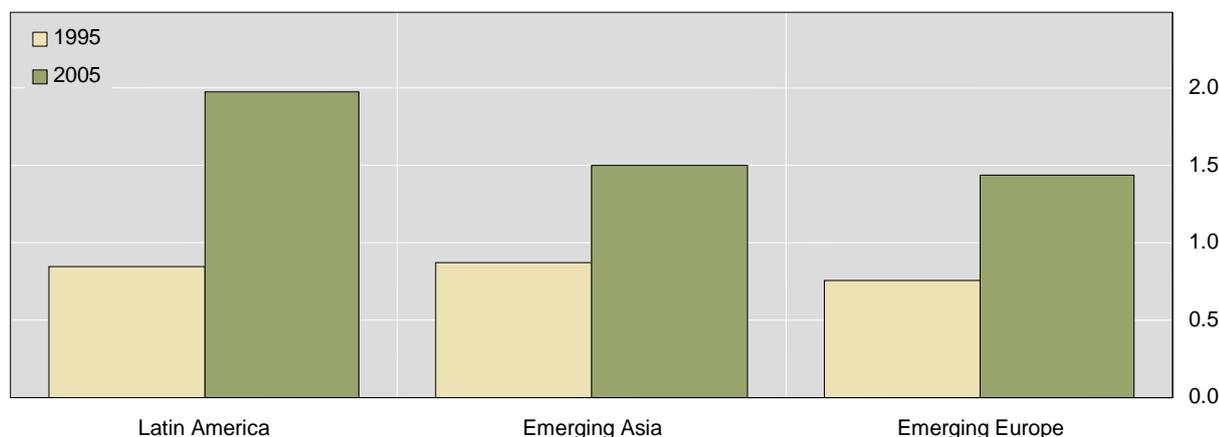
## 4. Remittances

The share of international migrant workers' earnings sent back to family members in countries of origin – usually referred to as remittances – has for several generations been an important means of support for those remaining at home. As migration has increased in recent decades, the corresponding growth of remittances has come to constitute a critical source of finance to many emerging economies. Moreover, the implications for national economies and the corresponding multiplier effects on GDP, consumption and investment of this source of funds are significant.

Latin America is perhaps a prime example of this trend. As a share of the region's output, remittances have on average more than doubled, increasing from 0.81% to 1.91% of GDP from 1995 to 2005. In this respect, Ecuador (5.59%), Mexico (2.83%) and Colombia (2.74%) have led the way in the Latin American markets (see Figure 9). However, the impact and importance of remittances is far more impressive if we expand this classification to include some of the smaller economies. For example, in the case of Haiti, remittance flows accounted for almost 40% of GDP during 2006. Similarly, in El Salvador and Nicaragua, this ratio reached almost 18% of total output. Remittances are by no means an exclusive Latin American phenomenon. Workers' earnings sent back to their country of origin have also soared in other emerging economies. In Asia, these flows have grown from an average of 0.8% of GDP to 1.5%. The Philippines, where remittances represented flows equal to 13.7% of GDP, and India, with flows equal to 2.9% of GDP, have led the expansion in this region.

In contrast, emerging Europe's remittances have grown from an average of 0.76% of GDP in 1995 to 1.44% of GDP in 2005. Reliable data prior to 1994 are hard to obtain; the breakup of the Soviet Union in 1991 caused the reclassification of many people living in one of the newly independent countries who were born in another country as international migrants. Nonetheless, the growth trend is quite robust in countries like Poland and Croatia, where remittances grew from 2.9% to 3.2% of GDP and from 0.6% to 1.2% of GDP, respectively.

Figure 9  
Flow of remittances<sup>1</sup>



For a list of countries included see Figure 1.

<sup>1</sup> As a percentage of the region's GDP; includes all countries of each region according to the World Bank classification.

Source: World Bank (2007), *World Development Indicators*.

Clearly, global remittance flows are on the rise. Yet these flows tend to grow faster and represent on average a greater share of the economy in Latin America than in other emerging regions. As Figure 9 shows, the World Bank estimates that for 1995–2005, remittances as a percentage of GDP grew 133% in Latin America, 89% in emerging Europe and 72% in emerging Asia.

## 5. Conclusion

Although financial development in the largest industrial economies started to accelerate in the 1970s, Latin American financial markets remained stagnant until the early 1990s, when financial intermediation by both financial institutions and capital markets increased exponentially and the array of financial services and instruments reached new dimensions. Capital flows waned at the end of the 1990s and continued to decline until 2002, due to economic and political turmoil in Latin America as well as in the rest of the world. Capital flows started a new wave in 2003, when concerns about Latin America declined and international investors returned to the region with decreasing spreads and a favourable international environment.

Capital markets in the region have grown considerably during the last decade but remain behind Asian and European emerging markets in terms of liquidity and efficiency. The development of domestic capital markets in Latin American countries arguably should provide additional insurance against a major destabilising sell-off in the debt or equity markets. Sell-offs are less likely when domestic investors hold a greater share of their own government's debt, and on average these investors are holding all domestic assets with longer-term horizons.

FDI has become the primary source of private capital flows to Latin America, accounting for two thirds of the flows to the region. In addition, the internationalisation of financial services demonstrates the preference of Latin American owners for foreign capital or alternative sources of financing. The banking sector appears generally sound, with adequate capitalisation, rising profitability, and improved asset quality. However, Latin American banking systems have a lot of room to grow as financial intermediaries. In the short run, the

banking sector may weather risks from international market volatility. However, Latin American banks will need to comply with Basel II standards and governments in the region need to develop comprehensive programs for financial development in order to strengthen the banking system and capital markets in the long term.

Remittances have for several generations been an important means of support for those remaining at home. As migration has increased, the corresponding growth of remittances has come to constitute a critical flow of finance to many emerging economies. Movement of people, most often through migration, is a significant part of global integration. Remittances have become a major financial and development topic throughout the region. While circumstances vary, the positive developmental implications of remittances are similar in each country.

As we enter this second half of the first decade of the 21st century, the combination of good economic fundamentals and policymakers' intentions to maintain macroeconomic policies are likely to anchor international and domestic market expectations. Perhaps the greater risk associated with the domestic economy is reform paralysis. Latin American governments that give in to social pressure may have little incentive to push forward with any of the remaining – and much-needed – reforms, such as in the fiscal, pension and financial arenas. Should external conditions deteriorate, the longer-term challenge confronting Latin America will be maintaining market confidence in the international capital markets.

## References

De la Torre, A, J Gozzi and S Schmukler (2006): "Capital market development: whither Latin America?", World Bank Working Paper Series 4156.

Jeanneau, S (2007): "Banking systems: characteristics and structural changes", *BIS Papers* no 33, February.

Tovar, C (2007): "Banks and the changing nature of risks in Latin America and the Caribbean", *BIS Papers* no 33, February.

United Nations Conference on Trade and Development (UNCTAD) (2006): *World Investment Report 2006*, ch 2, p 73.

# Policy space and the changing paradigm in conducting macroeconomic policies in developing countries

José Antonio Ocampo and Rob Vos<sup>1</sup>

## 1. Introduction

A stable macroeconomic environment is commonly considered to be conducive to long-term growth. Economists disagree, however, about whether price stability should be the central objective of macroeconomic policies or whether these policies should serve broader development goals. Furthermore, the concept of macroeconomic stability is itself subject to dispute, as reflected in the evolution of macroeconomic thinking and practice over the past quarter century.

In fact, the focus of macroeconomic policies in developing countries has shifted over recent decades. Until the 1970s, these policies were mostly embedded in broad, growth-oriented national development strategies. However, the severe macroeconomic instability that many developing countries have faced since the 1980s has narrowed the focus of macroeconomic policies to lowering inflation and avoiding major fiscal and external imbalances. Coinciding with this narrowing was a paradigm shift in the mainstream approach to macroeconomic policies in the developed countries, away from a Keynesian approach of countercyclical demand management aiming for full employment and towards a more conservative, monetarist view aiming at controlling inflation, which was seen as critical to long-term economic growth. In both developed and developing countries, the concept of short-term economic stability became in practice synonymous with low inflation, leaving aside the *real* dimensions of stability that had been the focus of both development policies (stable, long-term growth) and Keynesian management (smoother business cycles).

This new orthodoxy in macroeconomic policies prevailed during the 1980s and 1990s, but its effectiveness is increasingly being questioned. Though many developing countries managed to reduce inflation and restore fiscal balances by applying such policies, they failed to achieve strong and sustained economic growth. Moreover, the stabilisation policies quite often induced a “procyclical” pattern of macroeconomic policy responses, achieving one dimension of stability (eg low inflation) at the cost of others (eg stronger business cycles). A fundamental reason for the incapacity to achieve sustained economic growth is that procyclical adjustment typically damages public and private investment and thereby economic growth.

Critics of this framework have called for a return to the broader, developmental approach to macroeconomic stabilisation policies that are based on an integration of short-term, countercyclical fiscal and monetary measures with long-term development policies (see eg Ocampo (2005); Stiglitz et al (2006)). They stress that macroeconomic policies should be growth-centred, with full employment as the ultimate objective. They also argue that because

---

<sup>1</sup> Professor of Columbia University and former Under-Secretary General of the United Nations for Economic and Social Affairs, and Director of Development Policy and Analysis at the Department of Economic and Social Affairs of the United Nations (UN-DESA), respectively. Prior versions of this paper were presented at seminars organised by the Bank for International Settlements Representative Office for Latin America in Mexico and the Forum on Debt and Development (FONDAD) in New York. This paper draws from *World economic social survey 2006: diverging growth and development* (UN (2006)) and related research.

of differences in development level, quality of institutions, and degree of vulnerability to global macroeconomic and financial instability, the macroeconomic policy framework for developing countries could also differ in substantial ways from that in developed economies.

The broader approach to macroeconomic policies and its links with other economic policies (eg, production sector and trade strategies) is also needed because the nature of the growth process differs between developed and developing countries. In developed countries, productivity growth relies mainly on technological innovation. In contrast, developing countries can achieve productivity growth by shifting the labour force from low- to high-productivity sectors. As this process directly influences investment decisions and resource allocation, the impact of macroeconomic policies on growth will be stronger in developing than in more developed economies.

In this context, a critical question is how much “policy space” developing countries have to adopt autonomous and effective countercyclical macroeconomic policies consistent with longer-term development objectives. Many policy analysts feel that, with deeper integration into global markets, developing countries have lost such space.

Trade and terms-of-trade fluctuations have historically played a major role in the determination of business cycles in developing countries, particularly in commodity-dependent economies. The widespread shift towards export-led strategies in the developing world has actually accentuated this dependence in all countries. Domestic policies quite often respond procyclically to commodity price volatility, among others, by expanding fiscal expenditures during the boom and reducing spending when prices are down. The latter is reinforced by the conditionality linked to international financial assistance during crises, which involves orthodox macroeconomic stabilisation policy packages.

In many middle-income countries, in turn, business cycles have increasingly been influenced by *capital* account fluctuations. Strongly procyclical fluctuations in private capital markets are transmitted through public sector accounts, especially through the effects of available financing on government spending and through the effects of interest rates on the public debt service. But the stronger effects typically run through private spending and balance sheets. During booms, private sector deficits and borrowing tend to rise and risky balance sheets accumulate, riding on perceived “success”, typically seen to be reflected in low risk premia and spreads. Reversals in such perceptions lead to a cutoff from external financing and provoke sudden increases in the cost of borrowing, inducing downward adjustment. Developing country governments are then forced to adopt procyclical macroeconomic policies that reinforce the cyclical movements in financial markets. Indeed, during crises, the reputation and credibility of the government are judged by financial market agents according to its capacity to reduce emerging instability by containing inflation and fiscal deficits. This may set off a vicious circle between increased (country) risk premia, reduced availability of financing, and increasing restrictive fiscal and monetary policies, which can be particularly destabilizing in economies with high debt ratios (see eg Frenkel (2005)). At the same time, rising borrowing costs and rationing of credits in financial markets generate strong procyclical responses from market agents. Unstable external financing thus induces procyclical behaviour of both private agents and macroeconomic policies, which would suggest – in the words of Stiglitz (2003) – that Keynesian automatic stabilisers have been replaced with automatic destabilisers.

This paper argues that a more developmental and growth-friendly approach to macroeconomic policies in developing countries requires measures to mitigate the procyclical effects of financial markets, provide more stable aid inflows, deepen financial markets and strengthen domestic financial governance structures. Such conditions will create “policy space” for countercyclical macroeconomic policies.

Part 2 of this paper argues that procyclical macroeconomic policies in developing countries are associated with lower long-term economic growth because they generate greater volatility and uncertainty in the real economy. Part 3 discusses some key factors, both

external and domestic, that determine procyclicality in the macroeconomic policy decisions. Part 4 suggests a number of domestic and international actions that could be undertaken to enhance the macroeconomic policy space.

## 2. The cyclicity of macroeconomic policies in developing countries

The recent empirical growth literature has found increasing evidence that the way in which macroeconomic policies are conducted can have important implications for long-term growth. Aghion and others, for example, show that countercyclical policies can directly influence long-term growth (see Aghion and Howitt (2005); Aghion et al (2006)). When firms are financially constrained, an economic downturn would force them to cut investment, hampering growth in the long run. However, if the government has the fiscal space to increase public expenditures, reduce taxes, provide subsidies to private enterprises for long-term investment or relax the monetary stance during an economic downturn, the adverse impact on long-term investment and growth would be reduced.

In practice, however, macroeconomic policies in developing countries tend to be procyclical – exacerbating, rather than alleviating, the adverse impact of the downturns on long-term growth. In this regard, differences in the capacity of governments to conduct countercyclical policies could be a contributing factor to differences in growth among these countries.

Policy cyclicity is defined as the policy stance in relation to the growth rate of the economy. For example, fiscal policy is countercyclical when expenditures are increased and/or tax rates are decreased to counteract downturns in the economy and expenditures are decreased and tax rates increased when the economy is expanding.

Kaminsky et al (2004) examine the cyclicity of monetary and fiscal policies in a sample of 104 developed and developing countries for the period 1960–2003.<sup>2</sup> According to an index constructed as the weighted average of cyclicity in public expenditure and tax rates, Rwanda and Oman had the most procyclical fiscal policies, while Finland had the most countercyclical. The study found that, in general, macroeconomic policies tend to be procyclical in developing countries and countercyclical in developed economies. In particular, fiscal policy in Africa and Latin America has been highly procyclical while in the fast-growing economies in East Asia, fiscal policies have been either neutral to the business cycle or countercyclical (see Table 1).

There is, in turn, a strong negative correlation between procyclical fiscal behaviour and the rate of long-term growth when measured for a large sample of developing countries (see Figure 1), although there are important outliers. The direct link between the cyclicity of monetary policy and growth is much weaker, partly because of the technical difficulty in defining a proper cyclical index for monetary policy across all countries given the different monetary policy regimes.<sup>3</sup>

---

<sup>2</sup> Policy cyclicity is defined more specifically here as the correlation between the cyclical measure of a specific policy stance and the cyclical measure of GDP growth. The Hodrick-Prescott filter is the commonly used approach to isolate the cyclical from the “structural” component of the trends in output growth, fiscal spending, taxation and monetary variables.

<sup>3</sup> Compared to fiscal policy, it is more difficult to find a common measurement of monetary policy stance for all the countries, as some countries target the aggregate money supply, others target the interest rate and yet others target the exchange rate.

Table 1

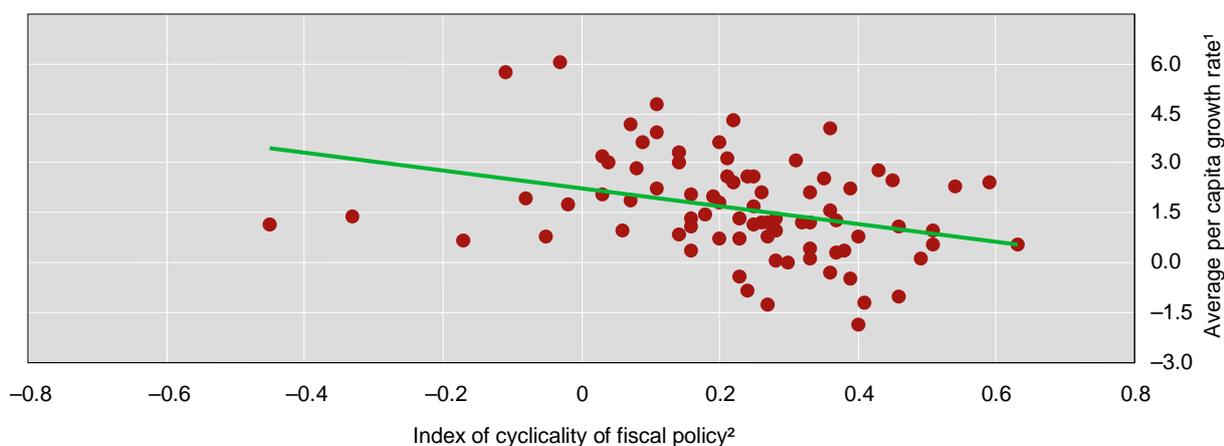
**Cyclicality of fiscal policy and economic growth 1960–2003**

<b>Region/country</b>	<b>Cyclicality of fiscal policy (index)<sup>1</sup></b>	<b>Average GDP per capita growth rate (in %)</b>
Africa	0.30 (highly procyclical)	1.1
Cameroon	0.51 (highly procyclical)	1.0
Côte d'Ivoire	0.38 (highly procyclical)	0.4
Kenya	0.26 (highly procyclical)	1.2
Rwanda	0.63 (most procyclical)	0.5
Latin America	0.25 (highly procyclical)	1.2
Argentina	0.28 (highly procyclical)	1.0
Brazil	0.22 (highly procyclical)	2.4
Colombia	–0.02 (acyclical)	1.8
Mexico	0.19 (moderately procyclical)	2.0
Peru	0.40 (highly procyclical)	0.8
Venezuela	0.36 (highly procyclical)	–0.3
Asia	0.16 (moderately procyclical)	3.3
Fast growing Asia	0.06 (acyclical)	4.4
China	–0.03 (acyclical)	6.1
Indonesia	0.09 (procyclical)	3.6
Korea, Republic of	–0.11 (countercyclical)	5.8
Malaysia	0.11 (procyclical)	4.0
OECD	–0.11 (countercyclical)	2.6
Finland	–0.51 (most countercyclical)	2.9
France	–0.24 (highly countercyclical)	2.5
Germany	–0.02 (acyclical)	1.9
Japan	0.05 (acyclical)	4.0
United Kingdom	–0.37 (highly countercyclical)	2.2
United States	–0.19 (moderately countercyclical)	2.2
High-to-middle income developing countries	0.28 (highly procyclical)	2.8
Middle-to-low income developing countries	0.17 (moderately procyclical)	2.0
Low-income countries	0.28 (highly procyclical)	1.0

<sup>1</sup> The index is constructed as a weighted average of indicators of fiscal policy cyclicality, which include public expenditure, a proxy for changes in tax rates and changes in expenditures over the business cycle in 104 countries. The index ranges from –0.51 to 0.63 where positive figures denote higher procyclicality and negative numbers, the level of countercyclicality. For more details, see Kaminsky et al (2004).

Source: United Nations (2006): Table IV.2.

Figure 1  
**Cyclicality of fiscal policy and economic growth in developing countries**  
 1960–2003



<sup>1</sup> In per cent. <sup>2</sup> Weighted average of indicators of fiscal policy cyclicality, including public expenditure, a proxy for changes in tax rates and changes in expenditure over the business cycle; positive figures denote higher procyclicality and negative numbers the level of countercyclicality. For more details see Kaminsky et al (2004).

Sources: UN (2006): Ch IV based on data by Kaminsky et al (2004); World Bank (2005), *World Development Indicators*.

In the face of volatile capital flows, exchange rate policies generate additional complications. A stable nominal exchange rate can provide an anchor for general price stability, which may be particularly useful for countries with a history of high inflation. Nonetheless, an exchange-rate peg limits or even eliminates manoeuvring room for conducting countercyclical monetary policies. Furthermore, strong speculative pressures during periods of sudden stops of external financing have made it more difficult for developing countries to maintain a fixed exchange rate regime, as attested by the various currency crises that occurred in countries that held on to a fixed peg.

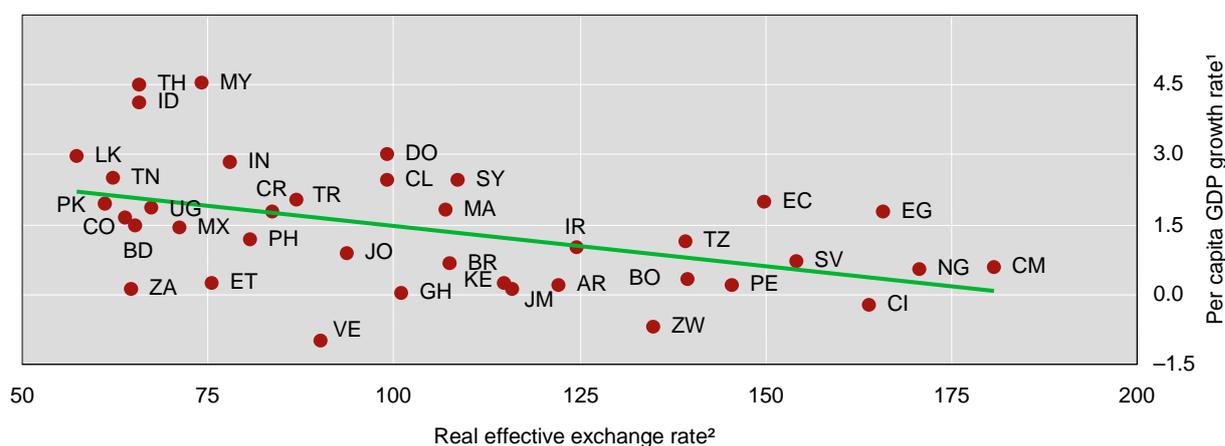
In response, many developing countries have moved towards more flexible exchange rate regimes. But flexible exchange rates are no panacea. One of the major risks that they pose is that of overvaluation during periods of capital surges and/or favourable terms of trade, as well as of overshooting depreciations during crises. Flexibility may thus result in excessive exchange rate volatility through the business cycle, which reduces the benefits from international specialisation. These disadvantages help explain why the move towards exchange rate flexibility has generally been mixed in the developing world, with some degree of central bank intervention in foreign exchange markets (often referred to as “dirty floats”).

Governments in these developing countries intervene in foreign exchange markets primarily to promote export competitiveness, targeting the real exchange rate. Aside from the strictly countercyclical reasons for such interventions, there may be long-term justifications: maintaining some level of exchange rate stability and competitiveness through the business cycle generates incentives to invest in export-oriented industries and creates more stable signals to allocate investment between tradable and non-tradable sectors.

Indeed, countries that were able to maintain a relatively stable and competitive real exchange rate seem to have fared better in terms of economic growth. Figure 2 shows the average degree of real exchange rate “appreciation” (or “overvaluation”) measured as the deviation of the purchasing power parity (PPP) of each country’s currency with respect to the United States dollar and adjusted for the difference in productivity growth of the country with respect to that of the United States. The countries in sub-Saharan Africa and Latin America are predominantly clustered in the lower-right part of the figure, indicating a combination of

an appreciated real exchange rate and lower growth. East and Southeast Asian countries are typically found in the upper-left quadrant, showing an association between more competitive exchange rates and higher economic growth. Exchange rate policies in most of these countries supported industrial and commercial policies to promote export-led growth.

Figure 2  
**Real effective exchange rate overvaluation and per capita GDP growth rate, selected economies**  
 1970–2003



AR = Argentina, BD = Bangladesh, BO = Bolivia, BR = Brazil, CI = Côte d'Ivoire, CL = Chile, CM = Cameroon, CO = Colombia, CR = Costa Rica, DO = Dominican Republic, EC = Ecuador, EG = Egypt, ET = Ethiopia, GH = Ghana, ID = Indonesia, IN = India, IR = Iran, JM = Jamaica, JO = Jordan, KE = Kenya, LK = Sri Lanka, MA = Morocco, MX = Mexico, MY = Malaysia, NG = Nigeria, PE = Peru, PH = Philippines, PK = Pakistan, SV = El Salvador, SY = Syria, TH = Thailand, TN = Tunisia, TR = Turkey, TZ = Tanzania, UG = Uganda, VE = Venezuela, ZA = South Africa, ZW = Zimbabwe.

<sup>1</sup> In per cent, using data at 1990 US dollars for calculations. <sup>2</sup> Values greater than 100 denote overvalued (appreciated) currencies and values less than 100, undervalued (depreciated) currencies.

Sources: United Nations Statistics Division; *Global Development Network Growth Database*, Development Research Institute, New York University.

The costs of procyclical policies for many developing countries are high. In the upturns, procyclical macroeconomic policies, such as imprudent fiscal spending, can lead to inefficient resource allocation, in some cases contributing directly to overheating in the economy and sowing the seeds for macroeconomic instability. In the downturns, procyclical policies, such as over-tightening of monetary policy and indiscriminate fiscal adjustments, can lead to substantial losses in many valuable social projects, weakening accumulation of infrastructure and human capital as well as aggravating the downturn and reducing the potential for long-term growth.

### 3. Factors underlying procyclicality in macroeconomic policies

Several factors can cause procyclicality in macroeconomic policies and limit their space to conduct countercyclical policies. Without trying to be exhaustive, we discuss in this section three factors we consider to be of major importance: the pass-through of capital account volatility to the domestic business cycle, including through policy responses; the macroeconomic effects of financial liberalisation in a context of underdeveloped domestic financial markets; and the institutional framework and restrictive rules guiding fiscal and monetary policies. This last factor has often been (self-)imposed to enhance policy credibility –

such as with an inflation-targeting regime – but may at the same time exacerbate procyclical tendencies in an economic adjustment process.

### 3.1 Capital account volatility and procyclical policy responses

International capital flows to developing countries have been volatile and a major source of macroeconomic instability. Both the availability and the cost of external financing ease during periods of economic expansion, whereas during downswings they tighten and become more expensive. As is well known, two *medium-term* cycles in capital flows had a strong impact on stability and growth in many countries (UN (2005), pp 74–5; UNCTAD (1999), Ch IV). A boom in international bank lending to developing countries in the 1970s ended in debt crises in the 1980s. Another boom took place in the 1990s, which was driven mainly by portfolio investment flows. To a lesser extent, foreign direct investment (FDI) came to an end with a sharp decline in net flows and a sharp rise in emerging market spreads after the Asian and Russian financial crisis of 1997–98. Since 2003, the recovery of private capital flows and the reduction in spreads have progressed at a rapid pace. This boom in external financing, together with other favourable conditions facing developing countries, indicates that we are currently in the midst of a third cycle, which was already subject to temporary and short-lived shake-ups, particularly in May–June 2006 and February and August 2007.

In all cycles, private capital flows to developing countries are concentrated in a small number of middle-income countries, bypassing most low-income countries, which remain dependent on official flows. The source of financing has also changed through time, responding to cyclical factors affecting the world economy, institutional changes in the financial sector of industrial countries and financial liberalisation policies in developing countries.

During the 1970s, the access of developing countries to private financing resulted in part from banks in the developed countries seeking new markets to turn their excess liquidity into profitable loans. The excess liquidity originated from oil surpluses that were largely deposited in the commercial banks, as well as from institutional changes in international financial markets that permitted the entrance of smaller and middle-sized banks that had previously not been allowed to engage in international lending. The increased competition in international lending further pushed down the cost of borrowing. At the same time, however, groups of banks shared risks through syndicated lending, which strengthened the concentration of loans among a few developing countries (see Vos (1994), Ch 5). The middle-income developing countries were seen as a good risk at the time, in part because of their strong export performance and the high commodity prices that prevailed during the 1970s, all of which benefited Latin American and other middle-income primary exporters.

Around 1980, the surge in bank lending came to a sudden stop as world interest rates rose and the perception of risk changed with the sudden increase in the debt-servicing burden of the borrowing countries. The subsequent massive withdrawal of bank loans accelerated the debt crises that spread among the developing countries. The rise in the cost of borrowing and the restriction of access came at a time when commodity prices collapsed and the need for external financing had actually increased.

After 1990, the entrance of new players into the market spurred renewed access to private capital flows. The new players included the pension funds and other institutional investors that had previously been permitted to operate only in domestic financial markets. In addition, the financial liberalisation processes in many developing countries eased the entrance of private capital flows. As mentioned above, much of the lending during this second cycle took the form of portfolio debt and equity investment which, even when formally long-term in character, have been much more volatile than FDI, indicating that market agents are dominated by short-term expectations in the supply of financing and perceptions of risk. Short-term bank loans have proven even more volatile. The Mexican peso crisis at the end of 1994 was good evidence of this volatility, but it was short-lived, thanks to a massive support

package from the United States. In contrast, the situation in East Asia initiated the broad-based series of financial crises in the final years of the decade.

Aside from their strong procyclical features, boom-bust cycles tend to spill over to other markets, generating the phenomenon that has come to be called financial market “contagion” – spreading both optimistic and pessimistic market sentiments, depending on the phase of the cycle. A country’s loss of access to markets for international banks or bonds spreads to other sources of financing (and can even affect market access of other countries), and an across-the-board market closure may follow (UN (2005)). The 1998 Russian crisis is an extreme example of sweeping market closure following a downturn. Even when countries do not fully lose market access, they are subject to increases in risk premia. The procyclical downgrades by credit-rating agencies often exacerbate both reduced access to portfolio loans and the spreads at which bonds can be issued.

With the reversal of short-term capital flows during the Asian financial crisis, FDI was resilient and became the dominant source of private capital flows to developing countries. It is worth noting that FDI also moves procyclically, although not to the same extent as short-term bank loans and portfolio investment (WB (1999)). FDI can also increase macroeconomic instability, in part because much of FDI takes the form of mergers and acquisitions of firms in developing countries, which depend on the procyclical availability of financing for such operations. To the extent that FDI is geared towards the domestic market, it responds to economic booms and downturns in the same way as domestic investment. On the other hand, the retrenchment in cross-border bank lending, the more recent growth of local bond markets in developing countries and the broadening of the investor base of international emerging market bonds have also helped to mitigate the volatility of capital flows in recent years (UN (2005), pp 89–90).

The procyclical nature of private capital flows limits the space for governments to conduct countercyclical macroeconomic policies. As access to finance eases when the economy is in an upswing, governments may be more inclined to allow the budget deficit to widen, and central banks may allow credit to the private sector to expand. Conversely, when during a downswing external financing contracts and the cost of borrowing rises, private sector credits also contract and non-interest fiscal spending may need to be severely retrenched – all of which exacerbates the recessionary trend in the economy. This reduced capacity to implement countercyclical policies implies that access to international financial flows also affects the real economy, although not by smoothing the business cycle, as anticipated by economic theory, but by magnifying it: inflows often lead to output expansion and outflows to contraction and stagnation (Prasad et al (2003); Kaminsky et al (2004); Stiglitz et al (2006)).

Financial volatility, rather than lack of price and wage flexibility (as emphasised in the past by the “neo-classical synthesis” and more recently by orthodox economists), is the major source of real macroeconomic volatility in developing countries (Easterly et al (2001)). Inadequate regulatory and legal frameworks and weak financial systems in developing countries increase the propensity for these systems to be unstable, as these conditions lead investors to engage in excessively risky lending (WB (1999); FitzGerald (2006)). Surges in external financing at initially low cost exacerbate the tendency for countries to take excessive risks and create the conditions for domestic financial systems to be volatile.

In developing countries, the governments’ room for manoeuvring in macroeconomic policymaking is limited to counteracting these developments with traditional instruments. Fiscal policy can always play a role but is likely to be a relatively ineffective instrument as the budget process tends to be inflexible relative to the volatility of capital flows. Moreover, using fiscal policy to counter volatility in financial markets conflicts with other developmental goals, such as the need to make sustained long-term investments in human resources and physical infrastructure (see below). Tighter monetary policy and sterilisation during financing booms can even lead to further increases in capital inflows with open capital markets. Particularly, it may attract volatile short-term flows to higher real interest rates. In turn, because of the lack

of space for effective countercyclical macroeconomic policies, the failure to contain the impact of surges in capital inflows means that a sudden stop of access to external financing will create large macroeconomic imbalances and sizeable downward adjustments of the economy. Under these conditions, contractionary monetary policies then just help transform the reduced availability of external financing into a domestic recession.

Exchange rate policies face additional tradeoffs. As previously noted, an exchange rate peg reduces the capacity of monetary policy to act as a countercyclical tool. Although a flexible monetary policy creates more space to undertake countercyclical monetary policies, it does so only at the cost of exacerbating cyclical swings in the exchange rate. Aside from the effects of real exchange rate volatility on growth, such swings have *procyclical* wealth (balance sheet) effects in economies where agents have net liabilities denominated in foreign currencies. Under such conditions, which are quite typical in developing countries, exchange rate appreciation during booms generates positive wealth effects, whereas devaluation during crises creates negative wealth effects. The additional degrees of freedom to undertake countercyclical monetary policies and the countercyclical effects that exchange rate fluctuations have on the current account may be entirely washed away by the procyclical wealth effects of currency adjustments (ie their effects through the capital account). Furthermore, although exchange rate fluctuations may reduce some sources of volatility, such as currency mismatches in portfolios, these fluctuations may generate other sources of volatility, such as short-term speculative moves.

All in all, neither a fixed nor a flexible exchange rate regime provides sufficient room for manoeuvre for countercyclical macroeconomic policies. Other policy instruments are needed, as discussed at the end of this paper.

The volatility and procyclical nature of private capital flows to developing countries also explain in part why no evidence can be found that such capital movements in general have resulted in increased investment or higher long-term economic growth during the past three decades (Ramey and Ramey (1995); Prasad et al (2003); Kose et al (2005)). Financial volatility has translated into increased investment uncertainty and greater output volatility, which, as discussed earlier, have been detrimental to long-term economic growth. Moreover, while capital surges stimulated aggregate demand and output, such welfare gains were often more than fully reversed in situations when the sudden stop triggered a financial crisis.<sup>4</sup>

### **3.2 The role of financial liberalisation and financial market development**

The impact of unstable capital flows on the business cycle cannot be separated from the process of financial liberalisation and the degree of financial market development in developing countries.

Financial liberalisation, at both the national and international level, has contributed to higher volatility and more procyclicality. Market agents tend to underestimate risk during booms, making loans to borrowers with lower credit quality. The rapid increase of asset prices during booms further stimulates credit growth. The tendency for provisions to be related to the

---

<sup>4</sup> Capital flow volatility has been an important cause of the financial crises that have occurred with increased frequency in developing countries since the 1980s. As crises have resulted in slow growth for a number of years after an initial large decline in output, they have reduced output levels below what they would have been otherwise. Some estimates put the cumulative loss of output at as much as 25% in the last 25 years (Eichengreen (2004)). Griffith-Jones and Gottschalk (2006) estimate the average annual costs incurred by the four hardest-hit Asian crisis countries (Indonesia, Korea, Malaysia, and Thailand) at around US\$ 150 billion during 1997–2002, or about 72% of their combined GDPs. Another study found an average cost of lost output (relative to trend output) of 18.8 percentage points of GDP per crisis during 26 banking and currency crisis episodes in emerging market economies in Latin America and Asia during the 1980s and 1990s (IMF (1998): Table 15). Losses in output growth occurred in three quarters of the cases.

current rate of loan delinquency (or the expected rate in the immediate future) further increases this procyclical bias. During booms, delinquencies are few and provisioning for loan losses is limited, all of which reduces the apparent costs of lending and thus increases credit growth. On the contrary, during downturns, delinquencies increase, provisioning has to increase and lending is curtailed and may even lead to a “credit squeeze” that amplifies the economic downswing. Concern about weaknesses in the financial system during a downturn may prompt the introduction of stronger regulatory requirements, further aggravating the problem of credit availability in the short term (Ocampo (2003)).

In this respect, the existence of an adequate regulatory framework is critical to mitigate the problems generated by excessive risk taking, but is not the only aspect that matters for financial stability. Insufficiently developed financial markets may also cause problems of financial instability in the face of capital flow volatility and further limit the effectiveness of fiscal and monetary policies. Important features of insufficiently developed financial markets in many developing countries are the shortage of an adequate supply of long-term bank lending and the absence of a domestic market for long-term government and corporate bonds denominated in the domestic currency. In a context of financial liberalisation, these deficiencies may create problems in investment as well as in financial stability. The lack of long-term financing makes it more difficult to fund public infrastructure investment and major private modernisation projects. It also forces firms seeking to finance long-term investments either to use short-term debt, thus accumulating maturity mismatches in their balance sheets, or to borrow more in international markets, leading to currency mismatches. Developing countries are thus characterised by private and public sector portfolios that hold variable mixes of maturity and currency mismatches. Such mismatches increase financial fragility in periods of exchange rate depreciation and rising interest rates, which usually coincide due to the procyclical availability of external financing. The insufficient development of domestic bond markets and the associated financial fragility in turn reduce the scope for monetary intervention to counteract external shocks.

The Asian crisis made clear the importance of domestic bond markets, which led to a stronger focus of financial policies on their development. As a result, domestic bond markets have grown rapidly since the late 1990s, not only in Asia, Latin America and the emerging countries of Europe, but also, to a lesser extent, in Africa (see Figure 3).<sup>5</sup> Although this is certainly a positive development, the lack of an adequate demand for long-term bonds in these markets implies that, in most cases, the reduction in currency risks has occurred at the cost of rising maturity risks. Also, in the presence of liberalised capital flows, these markets may be the subject of intense speculation when expectations regarding exchange rates are volatile. This was clearly manifested, for instance, during the period of turbulence that characterised world financial markets in May–June 2006.

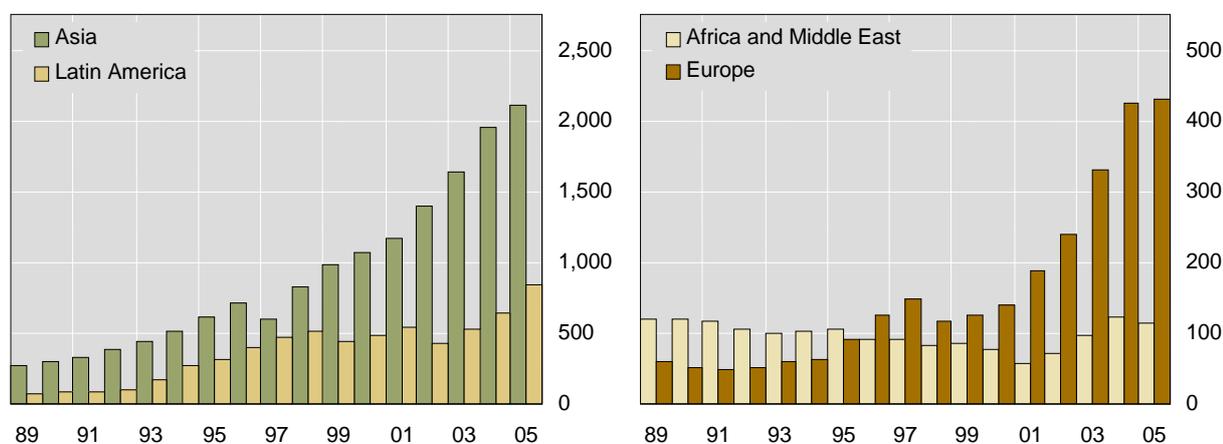
---

<sup>5</sup> The growth of the domestic bond market is also substantial when expressed as a percentage of GDP, increasing by 13–16 percentage points in Asia, Europe and Latin America. Only for Africa is there a decline, when expressed in these terms, by 0.5 percentage points.

Figure 3

### Domestic bond market growth in developing countries

Amounts outstanding, in billions of US dollars



Asia includes China, Hong Kong SAR, India, Indonesia, Malaysia, Pakistan, Philippines, Singapore, South Korea, Taiwan, Thailand; Africa and Middle East includes Lebanon and South Africa; Europe includes Croatia, Czech Republic, Hungary, Poland, Russia, Slovakia and Turkey; Latin America includes Argentina, Brazil, Chile, Colombia, Mexico and Peru.

Source: Ocampo and Griffith-Jones (2006).

Domestic financial liberalisation is frequently associated with integration into the global capital market – that is, with external financial liberalisation. In principle, this should make an international pool of liquidity available to the domestic financial system, which should then become more stable. However, as indicated above, the high degree of volatility of international capital inflows combined with the maturity and currency mismatches in the portfolios of economic agents makes the recipient countries subject to shocks and crises, which can be large and frequent.

These factors confirm the position taken in the Introduction of this paper, namely, that merely focusing macroeconomic policies on low inflation and restoring the fiscal balance may be too narrow of an approach to achieve desired growth gains, especially if the emphasis on monetary restrictions and fiscal prudence depresses economic activity in the short run and restricts broader developmental policies. Also, in a context of open and liberalised financial markets, the role of policies in promoting a growth-oriented environment for the private sector depends not only on macroeconomic and development policies, but also on the structure and level of development of the financial sector. The potential contribution of financial development to economic growth is considerable and financial liberalisation can help establish more efficient and liquid financial intermediation. However, as this section underscores, these contributions to growth cannot be taken for granted, and the growth impact depends on the construction of the appropriate institutional structure. Financial structures are very different across the world, and there is no unique relationship between financial structure and levels of or growth in income per capita. What matters is that the financial sector ensure adequate finance for productive investment of enterprises, including small and micro-enterprises and farms, and for long-term investment. Depending on the stage of development, doing so may imply ensuring a domestic bond market for long-term financing in the domestic currency and reserving an important role for public sector banks (particularly development banks). Institutional development should also guarantee adequate regulation and supervision to guarantee sound financial sector balance sheets.

### 3.3 Fiscal and monetary policy rules versus discretionary flexibility

Deficiencies in the domestic institutional framework typically provide other sources of procyclical macroeconomic policy stances and limits to the effectiveness of macroeconomic policies. One source, mentioned above, relates to fragile and poorly regulated banking and financial systems. Others relate to the framework for fiscal policy. In some cases, the origin may lie in volatile government revenues associated with heavy dependence on primary commodities and the related price fluctuations in global markets. When prices are high and the economy is booming as a result, governments tend to engage in expansionary spending behaviour. When prices collapse, government revenue falls, and fiscal austerity may be necessary at a time when the economy is entering a recession. Instruments such as stabilisation funds can be beneficial for commodity-exporting developing countries. Some countries have managed commodity stabilisation funds to smooth the impact of volatile commodity prices on fiscal income. Such funds have included Chile's Copper Compensation Fund, Colombia's National Coffee Fund and Burkina Faso's Cotton Support Fund. However, their performance has been variable, and hence also their role in mitigating the procyclical nature fiscal policy. The institutional capacity to manage these funds adequately is an important factor in their performance (Gottschalk (2005)).

Some developing countries, such as Chile during the current decade, have been able to manage fiscal targets that are independent of short-term fluctuations in economic growth (so-called structural budget rules). The management of this countercyclical policy stance has been one ingredient in Chile's much stronger growth performance and macroeconomic stability than that of other Latin American countries (Fiess (2002); Ffrench-Davis (2006)). Effectively managing such a system requires prudent and consistent policymakers and political support to uphold the rules.

More generally, since the 1980s there has been a shift from discretionary-based macroeconomic policy arrangements to rule-based ones, a shift based on the belief that the establishment of rules can avoid policy-generated macroeconomic instability. But an entirely rule-based system is not the answer, either. For instance, inflation targeting has been adopted in about 20 economies, including a fair number of developing countries. Under this monetary regime, an independent central bank commits itself to price stability by making public a pre-fixed inflation target range. There are a number of merits associated with such a policy arrangement, including its potential to enhance the central bank's policy transparency and credibility (UN (2000)). However, its narrow focus on the inflation target may generate a bias towards maintaining a strong exchange rate, make macroeconomic adjustment procyclical in response to external shocks (including shocks that affect the availability of external financing) and, more generally, bias macroeconomic stabilisation against employment and growth objectives.

Rule-based policies generally function well under normal circumstances but, as the economic structure changes over time and different shocks occur (both demand and supply shocks), the predetermined policy rules can become less relevant or too rigid. Moreover, because the risks and uncertainties that an economy faces may be non-stationary – that is, transitory shocks may permanently displace the trajectory of major macroeconomic variables – a certain degree of discretion in policymaking is always needed during abnormal periods, such as in crises, so as to minimise the risks for huge macroeconomic losses. The successful experience of East Asian economies and a few other developing countries has shown the merits of balancing rules and flexibility (UN (2006)).

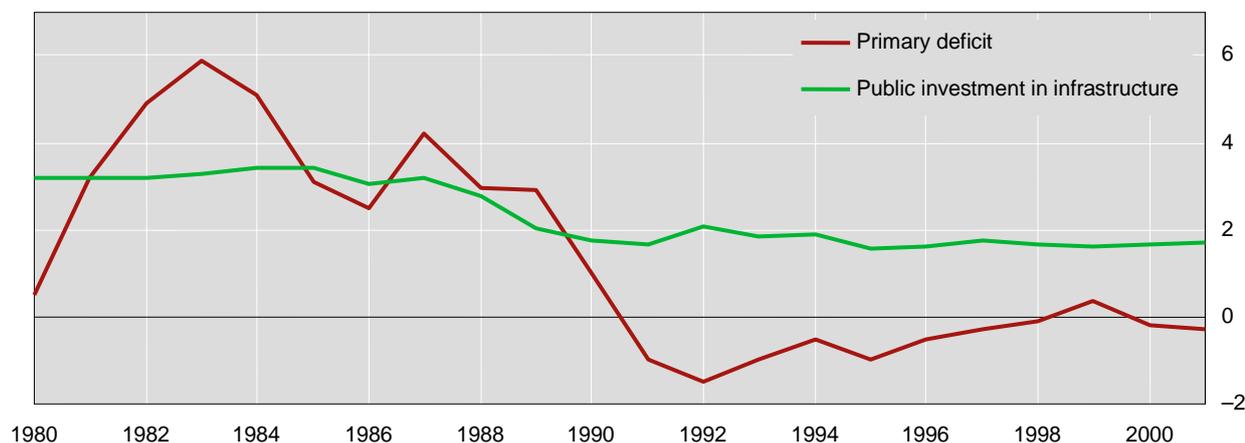
Procyclical macroeconomic policies probably also affect long-term investments in development, especially infrastructure and human capital development. The argument we develop here relates specifically to infrastructure investment, but similar arguments apply to expenditures in human development (see UN (2006)).

The countries of Latin America and sub-Saharan Africa have exhibited procyclical fiscal behaviour and have failed to sustain adequate levels of investment in physical infrastructure. The precise causality may have to be established on a country-by-country basis, but it is noteworthy that the East Asian countries that maintained more neutral or countercyclical policy stances did maintain relatively high levels of infrastructural investment. While in Africa

aid seems to have helped to sustain capital expenditures (though not maintenance expenditures), Latin American countries witnessed a decline in infrastructural investment over time as a result of increased fiscal austerity since the 1980s. Public spending on infrastructural investment declined from 3% of GDP in 1980 to less than 1% in 2001 for a group of seven Latin American countries (see Figure 4 and WB and IMF (2006)).

Figure 4

**Latin American primary deficit and public infrastructure investment<sup>1</sup>**



<sup>1</sup> GDP weighted regional average of public investment and primary fiscal deficit based on data for Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.

Sources: World Bank; IMF (2006).

Much of the decline in public spending can be traced to fiscal adjustment as implemented in stabilisation programmes, which were, as indicated, largely procyclical. Such spending cuts may reflect policymakers' preferences over reductions in current expenditure, which would be more difficult to sustain politically in the short term. Yet these cuts compromise long-term fiscal sustainability as the potential for additional fiscal revenues – at given levels of taxation – is reduced by lower growth in the future. Moreover, there are non-linear scale effects of infrastructure on growth; the incapacity to maintain infrastructure above certain minimally necessary thresholds may halt the growth process altogether. Analysts have estimated, for example, that the reduced infrastructure asset accumulation resulting from lower public investment lowered GDP growth by more than one percentage point in several Latin American countries during the 1980s and 1990s (Calderón et al (2003); Rodríguez (2006)). As a result, much of the anticipated favourable effect of infrastructure spending reduction on the fiscal position was offset by higher deficits resulting from lowered output growth in the years following the adjustment. Apart from cases of politically motivated and inefficient or unnecessary investment, lower public spending on infrastructure will eventually weaken rather than strengthen fiscal solvency, which is contradictory to the initial intention of fiscal adjustment.

In sum, procyclical macroeconomic policies may be intrinsic to a country's institutional framework, and are enhanced, in particular, by excessive reliance on external sources of finance and unstable tax bases. It is therefore important to find institutional ways to create more space for countercyclical macroeconomic policies.

## **4. Policy implications**

### **4.1 A broad framework for macroeconomic stability**

Macroeconomic stability strongly influences the long-term growth performance of an economy. However, it should be seen as more than just preserving price stability and sustainable fiscal balances. Macroeconomic stability is also about avoiding large swings in economic activity and employment and, further, about maintaining sustainable external accounts and avoiding exchange rate overvaluation. The frequency of financial crises in developing countries indicates that macroeconomic stability is also about maintaining well regulated domestic financial sectors, sound balance sheets of the banking system and sound external debt structures.

Strong and sustainable growth makes it easier to achieve greater macroeconomic stability by enhancing, among other things, the sustainability of domestic and foreign public debt. Conversely, greater stability, in its broad sense, reduces investment uncertainty and hence is supportive of higher long-term growth.

For many governments of developing countries, the space for conducting countercyclical macroeconomic policies is limited, as the available fiscal and foreign exchange resources tend to be small relative to the size of the external shocks they face. International action mitigating the impact of private capital flow volatility (see below) can enhance the necessary policy space. Nevertheless, governments of developing countries can take measures at the national level to enhance the scope for countercyclical policies by improving their institutional framework for macroeconomic policymaking.

### **4.2 Macroeconomic policies and national development strategies**

The more appropriate institutional setting for fiscal policy should strike, first of all, a balance between fiscal prudence and flexibility in a way that ensures both policy credibility and fiscal sustainability. Setting fiscal targets that are independent of the short-term fluctuations in economic growth (so called structural budget rules) can be an effective means to force a countercyclical policy stance. Fiscal stabilisation funds can also help smooth over time the revenues from unstable tax sources, such as those based on primary export production. Although the experience with the application of such funds in various parts of the world has varied, they can become an effective instrument for resolving inter-temporal tradeoffs in fiscal spending by protecting growth-enhancing, long-term public investment in infrastructure and human development, even during times of lower tax revenue caused by external shocks and economic downturns.

Second, policies should leave room for governments to retain a certain degree of discretionary power. Rule-based policies may be too rigid to respond to macroeconomic volatility. Furthermore, some rule-based regimes, such as inflation targeting, may bias macroeconomic stabilisation toward a narrowly defined target (low inflation) and against broader employment, growth and other developmental objectives.

Third, macroeconomic policies should be well integrated with other areas of economic (and social) policymaking. In the fast-growing East Asian economies, for example, macroeconomic policies were part of a broader development strategy, contributing directly to long-term growth. Fiscal policies in these economies have prioritised development spending, including investment in education, health and infrastructure as well as subsidies and credit guarantees for export industries. Monetary policy was coordinated with financial sector and industrial policies, including directed and subsidised credit schemes and managed interest rates to directly influence investment and saving, whereas competitive exchange rates were considered essential to encouraging exports and export diversification. In contrast, macroeconomic policies in many Latin American and African countries since the 1980s have

been focused on much more narrowly defined short-term stabilisation objectives and have resulted many times in exchange rate overvaluation.

Finally, in today's open economies, a competitive real exchange rate seems to be critical for achieving such crucial development objectives as the diversification of production and export structures, which is critical to growth, and employment generation. Active exchange rate strategies are needed to achieve this task, as are complementary policies that may improve real exchange rate competitiveness. The association between real exchange rate stability and growth implies, therefore, that some degree of real exchange rate targeting should be a main objective of central bank policies.

### **4.3 Capital account and financial market policies**

Managing countercyclical macroeconomic policies in the face of volatile capital flows may require the use of additional policy instruments. Given that the major source of disturbances is associated with the integration of developing countries into global financial markets, managing such integration makes sense (Ocampo (2003); Stiglitz et al (2006)).

The mix of maturity and currency mismatches that characterise the balance sheets of financial and non-financial firms in developing countries is a major determinant of the vulnerability of developing countries to financial market volatility. This is why creating long-term domestic markets for assets denominated in the domestic currency and developing well functioning derivative markets as protection against exchange rate and interest rate fluctuations should be at the centre of financial policies.

In the face of significant levels of segmentation in international capital markets, deliberate segmentation of domestic and financial markets also makes sense, as it helps to protect the domestic economy from the volatility produced by capital market liberalisation. Since the local currency and the local currency assets of most developing countries do not have a stable foreign demand, their domestic capital markets are already segmented from international markets. In turn, the highly procyclical pattern of provisioning of finance to developing countries reflects the segmentation of international capital markets according to the perceived level of risks of different assets and debtors, and the associated alternation of periods of "risk appetite" and "flight to quality". Well designed quantity- or price-based capital account regulations can be used to segment the markets more effectively. Such regulations may be understood as a "second-best" intervention that is already in place. While quantity-based regulations can be more effective in the short term, price-based regulations are more market-friendly (Ocampo (2003)). Nevertheless, it certainly does not make sense to design regulations as if segmentation did not exist.

Managed segmentation also enhances the ability of government to control the macroeconomy. The ability of policymakers to use restrictive monetary policies during times of euphoria and to avoid excessively contractionary policies during crises (in other words, the level of a government's monetary autonomy) is enhanced by constraints on capital mobility, which, in turn, depend on the degree of market segmentation. Similar arguments apply to the exchange rate. Segmentation increases a government's ability to use the exchange rate as a macroeconomic policy tool and improves the effectiveness of exchange rate management. It can help avoid overvaluation and smooth the procyclical wealth effects that characterise economies with large debts denominated in foreign currencies.

Governments can use "soft controls" to segment the market directly. Soft controls can, for example, require domestic funds, such as social security or pension funds, to invest their assets in domestic rather than foreign markets or to limit the amount of funds in foreign markets. These restrictions reduce the likelihood of procyclical disturbances generated by these funds. Soft controls have additional positive effects on the economy: they create a local demand for domestic securities, help to develop the local capital markets and build a

domestic capital base. In these ways, soft controls can help remedy one of the market failures discussed earlier: that of under- and undeveloped capital markets.

In addition to direct regulations, governments can use a variety of indirect measures to control (or at least influence) capital account inflows and outflows. The most critical use of regulations is to avoid currency mismatches in the balance sheets of financial and non-financial agents. Prudential regulations on the banking system are one such tool. Numerous countries forbid, or strictly limit, banks from holding currency mismatches on their balance sheets. To avoid domestic financial dollar-/euroisation, many countries also prevent financial institutions from allowing domestic residents to hold deposits in foreign currencies, or limit the nature and use of such deposits. Bank regulators can also prohibit domestic banks from lending in foreign currencies to firms that do not have matching revenues in those currencies. More subtly, they can impose higher risk-adjusted capital adequacy requirements or additional liquidity and/or loan-loss provisioning (reserve) requirements on foreign currency loans made to domestic agents who lack matching revenues.

Regulations can also directly target borrowing abroad by non-financial firms. Such regulations might include rules on the types of firms that can borrow abroad (eg only firms with revenues in foreign currencies) and set prudential ratios for such firms. Regulations might also include restrictions on the terms of corporate debt that can be contracted abroad (eg minimum maturities and maximum spreads) and public disclosure of the short-term external liabilities of firms.

These alternative measures rely on a combination of banking regulations and complementary policies aimed at non-financial firms, but the direct capital account regulations discussed earlier may be simpler to administer. Such controls may work better because they are aimed at the actual source of the disturbance, ie procyclical capital flows. Developing countries with strong administrative capabilities may be able to handle a combination of direct and indirect measures in order to reduce capital flow volatility and limit circumvention by investors of those measures through the use of derivative products.

Finally, to reduce the procyclicality brought by the financial sector volatility, one possible policy measure is to require forward-looking provisioning that is estimated on the basis of expected or latent losses (rather than on prevailing losses) when loans are disbursed, taking the full business cycle into account (Ocampo (2003)). Such a step would help smooth the cycle by increasing provisions or reserves during boom periods and thereby help to reduce the credit crunch during downturns. Along with this measure, regulators should encourage the adoption of risk management practices and models that would allow lending strategies that are less sensitive to short-term factors (see eg Griffith-Jones et al (2003)).

#### **4.4 International policies to reduce financial volatility**

A major challenge for multilateral financial institutions is to help developing countries mitigate the damaging effects of volatile capital flows and provide countercyclical financing mechanisms to compensate for the inherently procyclical movement of private capital flows. A number of options are available to dampen procyclicality and thereby help create a better environment for sustainable growth (Ocampo and Griffith-Jones (2007)).

A first set of measures would be for the multilateral development banks and export credit agencies to adopt financial instruments that reduce currency mismatches and link debt service obligations to the capacity of developing countries to pay (eg through GDP- or commodity-linked bonds). In addition, these institutions could issue public loan guarantees with countercyclical features.

Multilateral surveillance, primarily by the IMF, should remain at the centre of crisis prevention efforts. Enhanced provision of IMF emergency financing in response to external shocks is essential for lowering the unnecessary burdens of adjustment and the costs of large reserve balances. For both middle- and low-income countries, the appropriate facilities should

include liquidity provision to cover fluctuations in export earnings, particularly those caused by unstable commodity prices and natural disasters. Access to official international liquidity during capital account crises should be facilitated and made commensurate with the potentially large needs of countries, which may surpass normal lending limits based on IMF quotas.

Despite recent progress in advancing a market-based approach to the orderly and cost-effective resolution of debt crises (eg the adoption of collective action clauses in sovereign bond contracts and the “Principles for Stable Capital Flows and Fair Debt Restructuring in Emerging Markets”), there is no consensus on the role to be played by multilateral institutions. The review of the effectiveness of the IMF instruments in facilitating crisis resolution, including “lending into arrears” policy and information dissemination, should help clarify the role the IMF could play in crisis situations, thus providing an additional means for helping countries get back on the road to sustainable economic growth.

## References

Aghion, P and P Howitt (2005): “Appropriate growth policy: a unifying framework,” The 2005 Joseph Schumpeter Lecture at the 20th Annual Congress of the European Economic Association, 25 August, Amsterdam.

——— R Barro and I Marinescu (2006): “*Cyclical budgetary policies: their determinants and effects on growth*,” work in progress.

Calderón, C, W Easterly and L Servén (2003): “Infrastructure compression and public sector solvency in Latin America,” in W Easterly and L Servén (eds), *The limits of stabilization: infrastructure, public deficits and growth in Latin America*, Palo Alto, California and Washington DC: Stanford University Press and World Bank, pp 119–38.

Easterly, W, R Islam and J Stiglitz (2001): “Shaken and stirred: volatility and macroeconomic paradigms for rich and poor countries,” in B Pleskovic and N Stern (eds), *Annual World Bank Conference on Development Economics 2000*, Washington DC, pp 191–212.

Eichengreen, B (2004): “Financial instability,” paper written for the Copenhagen Consensus, 25–28 May, Copenhagen.

Ffrench-Davis, R (2006): *Reforming Latin America’s economies: after market fundamentalism*, London: Palgrave-Macmillan.

Fiess, N (2002): “Chile’s new fiscal rule”, mimeo, World Bank, May.

FitzGerald, V (2006): “Financial development and economic growth: a critical survey”, background paper for the World Economic and Social Survey 2006: Diverging Growth and Development, United Nations, [www.un.org/esa/policy/wess/index.htm](http://www.un.org/esa/policy/wess/index.htm).

Frenkel, R (2005): “External debt, growth and stability”, in J A Ocampo (ed), *Beyond reforms: structural dynamics and macroeconomic vulnerability*, Palo Alto: Stanford University Press and ECLAC, pp 189–209.

Gottschalk, R (2005): “The macro content of PRSP: assessing the need for a more flexible macroeconomic policy framework”, *Development Policy Review*, 23(4), pp 419–42.

Griffith-Jones, S and R Gottschalk (2006): “Financial vulnerability in Asia”, March, [www.asia2015conference.org](http://www.asia2015conference.org).

———, M Segoviano and S Spratt (2003): submission to the Basel Committee on Banking Supervision: CP3 and the developing world, Institute of Development Studies, Brighton, Sussex, <http://stephanygj.com>.

International Monetary Fund (IMF) (1998): *World economic outlook: May 1998*, Washington DC, IMF.

Kaminsky, G, C Reinhart and C Végh (2004): "When it rains it pours: pro-cyclical capital flows and macroeconomic policies", *NBER Working Paper*, no 10780, National Bureau for Economic Research.

Kose, M, E Prasad and M E Terrones (2005): "Growth and volatility in an era of globalization", *IMF Staff Papers*, vol 52, pp 31–63.

Ocampo, J (2003): "Capital-account and counter-cyclical prudential regulations in developing countries", in R Ffrench-Davis and S Griffith-Jones (eds), *From capital surges to drought: seeking stability for emerging markets*, London: Palgrave-Macmillan, pp 217–44.

——— (2005): "A broad view of macroeconomic stability", DESA working paper, no 1, October, New York, [www.un.org/esa/desa/papers](http://www.un.org/esa/desa/papers).

——— and S Griffith-Jones (2007): "Counter-cyclical framework for a development-friendly international financial architecture", DESA working paper, no 39, June, New York, [www.un.org/esa/desa/papers](http://www.un.org/esa/desa/papers).

Prasad, E, K Rogoff, S Wei, and M Kose (2003): "Effects of financial globalization on developing countries: some empirical evidence", *IMF Occasional Paper*, no 220, International Monetary Fund, Washington DC.

Ramey, G and V Ramey (1995): "Cross-country evidence on the link between volatility and growth", *American Economic Review*, vol 85, no 5.

Rodríguez, F (2006): "Have collapses in Infrastructure spending led to cross-country divergence in per capita GDP?", UN-DESA background paper for *World Economic and Social Survey 2006: Diverging Growth and Development*, United Nations, New York, [www.un.org/esa/policy/wess/index.htm](http://www.un.org/esa/policy/wess/index.htm).

Stiglitz, J (2003): "Whither reform? Toward a new agenda for Latin America", *CEPAL Review*, 80, pp 7–38.

——— J Ocampo, S Spiegel, R Ffrench-Davis and D Nayyar (2006): *Stability with growth*, Oxford and New York: Oxford University Press.

United Nations (UN) (2000): *World economic and social survey, 2000*, Sales no E.00 .II.A4, New York.

——— (2002): *World economic and social survey, 2002*, Sales no E.02.II.A4, New York.

——— (2005): *World economic and social survey, 2005*, Sales no E.05.II.C.1, New York.

——— (2006): *World economic and social survey, 2006: Diverging growth and development*, Sales no E.06.II.C.1, New York.

United Nations Conference on Trade and Development (UNCTAD) (1999): *Trade and development report 1999*, Geneva.

Vos, R (1994): *Debt and adjustment in the World Economy*, London: Macmillan.

World Bank (WB) (1999): *Global economic prospects 1998/99: beyond financial crises*, Washington DC

——— and International Monetary Fund (IMF) (2006): *Global economic monitoring report 2006: millennium development goals – strengthening mutual accountability, aid, trade and governance*, World Bank, Washington DC.

# Latin America's local currency bond markets: an overview<sup>1</sup>

Serge Jeanneau<sup>2</sup> and Camilo E Tovar<sup>3</sup>

## 1. Introduction

Domestic bond markets have remained underdeveloped for much of Latin America's modern history owing to a number of policy and structural impediments. The resulting structure of domestic government and private sector debt, which was heavily biased towards short-term and/or dollar-indexed liabilities, contributed to a worsening of the financial crises in the region during the 1990s and early 2000s.

In recent years, however, domestic bond markets have constituted a growing source of financing for Latin American economies and of portfolio allocation for global investors (Figure 1). This has called into question the view that countries in the region cannot borrow in local currency at longer maturities, sometimes referred to as the "original sin" hypothesis.<sup>4</sup> The expansion of these markets has reflected a conscious effort by the authorities of most countries to reduce their vulnerability to adverse external shocks. In this context, a key objective has been the strengthening of demand conditions for domestic debt. This has been accomplished inter alia through a transition to more stable macroeconomic policies; a move to privately funded and managed pension systems; and the removal of restrictions on foreign investment. Policy initiatives have also been taken on the supply side, including a gradual shift of government liabilities to the domestic market, a move to greater predictability and transparency in debt issuance and attempts to create liquid benchmark securities. Such initiatives have been supported by a particularly favourable external environment, including high commodity prices and their beneficial effects on internal and external accounts, together with a search for yield on the part of international investors. Notwithstanding the progress made so far, major challenges remain in improving market access to the private sector.

Drawing mainly on national sources, this paper documents the achievements made so far in developing domestic bond markets in the seven largest countries of the region. It is organised as follows. Section 2 discusses the value of more developed bond markets for financial stability. Section 3 provides a brief overview of the factors underlying the historical underdevelopment of bond markets in the region, summarises the main features of such markets and, finally, discusses some of the elements supporting their recent expansion.

---

<sup>1</sup> The views expressed are those of the authors and do not necessarily reflect those of the BIS. We thank Philip Turner and Michela Scatigna for their comments, Rodrigo Mora for research assistance and Alejandra Gonzalez for editorial support.

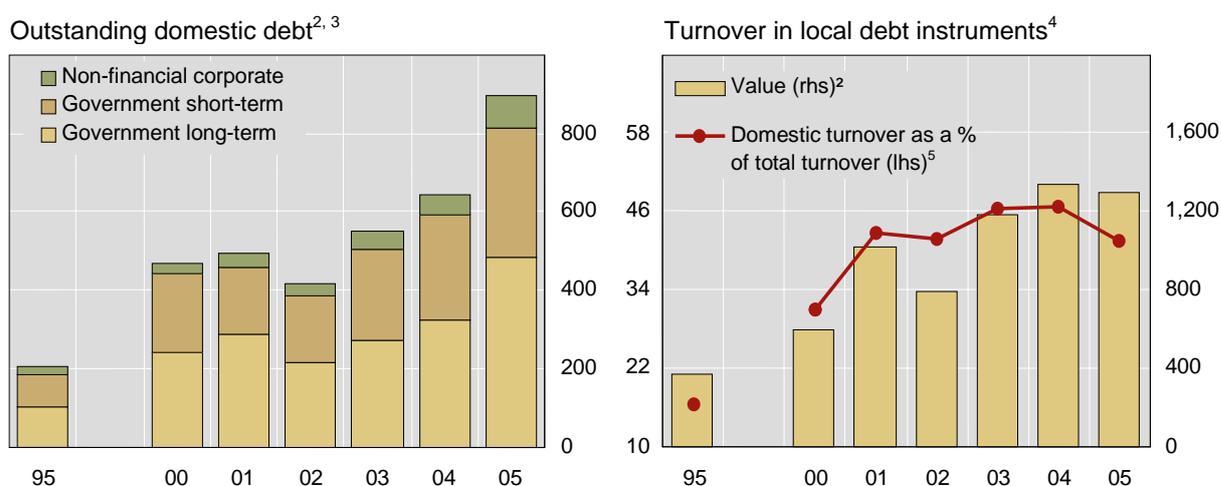
<sup>2</sup> Bank for International Settlements; serge.jeanneau@bis.org.

<sup>3</sup> Bank for International Settlements; camilo.tovar@bis.org.

<sup>4</sup> The different sides of the "original sin" debate are set out in Eichengreen and Hausmann (2005) and Appendix B of Goldstein and Turner (2004).

Figure 1

### Domestic debt in Latin America<sup>1</sup>



<sup>1</sup> Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. <sup>2</sup> In billions of US dollars. <sup>3</sup> End of period. <sup>4</sup> Annual total. <sup>5</sup> Domestic and international transactions.

Sources: EMTA; national authorities.

## 2. The value of domestic bond markets

The main benefit of the development of domestic bond markets is that they make financial markets more complete and efficient, which allows agents in the economy to better diversify their risks, thereby helping to make domestic financial markets more stable.

Bond markets are central to the development of an efficient financial system as they lead to the generation of market interest rates that reflect the opportunity cost of funds at a wide range of maturities. In economies lacking well developed debt markets, interest rates may not be competitively determined and thus may not reflect the true cost of funds. The availability of a wide range of financial assets also enables savers and investors to tailor their financial decisions to their preferences and requirements, which is essential for an efficient functioning of the intermediation process. The broadening of financial channels can also provide better opportunities for portfolio diversification, which should have a positive impact on saving and investment.

The development of bond markets is also a means of creating a better diversified and more robust financial system by broadening the availability of financial structures. One consequence of the limited availability of financial assets is that it can lead to the taking of potentially risky financial exposures. For instance, if firms or households are unable to finance the acquisition of long-term assets with long-term debt, then their decisions may be biased against long-term investment. If borrowers finance long-term investments with short-term debt, they become exposed to significant mismatches between their assets and their liabilities. Alternatively, if firms attempt to compensate for the lack of a domestic bond market by borrowing on the international market, they may expose themselves to excessive foreign exchange risk. While it is neither possible nor desirable to entirely eliminate maturity and currency mismatches in a financial system, the development of a more complete array of financial assets should help economic agents in selecting the financial structures that are most appropriate to their circumstances and thus reduce any unwanted mismatches.

The development of domestic debt markets should also help in reducing the concentration of intermediation in the banking system.<sup>5</sup> The damage caused by banking crises in the 1990s has generally been much higher in countries where corporate credit risk was concentrated in the commercial banking system. The existence of an active bond market would give corporations an alternative means of financing in the event that banks could not do so, thus reducing the potentially adverse effect on the economy of a bank-induced credit crunch (often referred to in the literature as the “spare tire” hypothesis). Also, the availability of non-bank intermediation may increase competition and contribute to a reduction in intermediation margins.

In addition, the development of liquid underlying asset markets is a key prerequisite for the creation of liquid risk transfer instruments, such as derivative contracts. Derivatives allow risks to be transferred across the financial system to the entities best placed to bear and manage them, which in principle should help strengthen the financial system. The availability of liquid hedging instruments should also facilitate the role that banks play in the maturity transformation process, with a corresponding increase in the availability of funds at various maturities. The need for such instruments is now all the greater as financial and capital account liberalisation leads to greater interest and exchange rate volatility.

Fostering debt markets may also help the operation of monetary policy. As highlighted by Turner (2002), a well functioning money market is essential for the smooth transmission of monetary policy, particularly since central banks increasingly rely on indirect instruments of control. Furthermore, prices in the long-term bond market give valuable information about expectations of likely macroeconomic developments and about market reactions to monetary policy moves.

Finally, local currency bond markets allow for a non-inflationary funding of fiscal deficits (Turner (2002) and WB (2001)).

### **3. Bond markets in Latin America**

In assessing the development of bond markets in Latin America and the implications that this has for financial stability, it is necessary to take into account, first, the reasons for the historical underdevelopment of those markets and, second, the factors that have led to their recent expansion. In what follows, a brief overview of these elements is provided.<sup>6</sup>

#### **3.1 Historical underdevelopment of domestic bond markets**

Domestic bond markets have remained underdeveloped for much of Latin America’s modern history. This phenomenon has been related to a number of policy and structural impediments.

First, a poor record of macroeconomic management, as reflected in high fiscal deficits and inflation, has deterred governments or other borrowers from introducing standard long-term debt securities in the domestic market.<sup>7</sup> Entrenched inflationary expectations have meant

---

<sup>5</sup> For an overview of banking systems in Latin America see BIS (2007).

<sup>6</sup> See IDB (2006) for a review of the history of debt in Latin America.

<sup>7</sup> A study by Burger and Warnock (2003) has shown that high and variable inflation rates are a significant impediment to the development of domestic bond markets in emerging economies. See Borensztein et al (2006b) for a recent econometric analysis aimed at identifying factors associated with the underdevelopment of Latin America’s bond markets. According to this study, a limited number of observable policy variables and country characteristics explain 70% of the bond market capitalisation difference between Latin America and the industrial countries. Policy variables such as macroeconomic stability (measured by the volatility of the exchange rate), openness, investor protection and the cost of enforcing a contract can explain a quarter of the difference in bond market capitalisation between these regions. However, they fail to find a significant

that lenders were willing to lend in domestic currency only at very short maturities or with returns indexed to inflation, short-term interest rates or foreign currencies.

Second, the absence of a broad and diversified investor base has hindered the development of deep bond markets. Until the late 1990s, institutional investment played a limited role in most emerging market countries outside of Chile, as illustrated by the much smaller stock of assets managed by institutional investors than in the industrial world (as a share of GDP).<sup>8</sup> Even where institutional investment was sufficiently developed, restrictions on asset holdings, particularly on lower-rated or private sector securities, have narrowed investment opportunities.

Third, primary markets have been hindered by inefficiencies that increased the implicit cost of local issuance, such as lengthy registration procedures and uncompetitive underwriting arrangements. These inefficiencies occurred despite evidence for some countries that the direct cost of local issuance is lower than that of international issuance (Mathieson et al (2004)). Primary market issuance has also been hampered by the existence of capital controls or other regulations that have effectively closed local markets to foreign investors.

Fourth, various policies or regulatory restrictions have impeded the development of liquidity in secondary markets.<sup>9</sup> Some monetary policy operating procedures have created excessive volatility in money markets, which has exacerbated liquidity risks for traders. Restrictions, including interest rate controls and investment regulations, have inhibited active trading. Transaction and withholding taxes have also been an impediment to trading. Moreover, market liquidity has been constrained by the lack of a proper infrastructure for trading in government bonds, including a system of primary dealers obligated to provide two-way quotes and the availability of repurchase agreements and interest rate derivatives.

Lastly, many countries have lacked an adequate infrastructure for the development of private sector debt securities. Constraining factors have included the lack of long-term government benchmarks used in the pricing of corporate liabilities, insufficient protection of property rights, lax accounting standards and poor corporate governance. In addition, the limited penetration of credit rating agencies has constrained the analysis of corporate credit risk.

### 3.2 Main features of bond markets in Latin America<sup>10</sup>

The issuance of domestic securities has expanded rapidly in Latin America over the past decade (see Figure 1).<sup>11</sup> The amount of such securities issued by central governments and non-financial corporate entities from the seven largest countries in the region rose by 337% between the end of 1995 and the end of 2005, to \$895 billion, equivalent to about 40% of those countries' combined GDP. By comparison, the total stock of securities issued by such borrowers in international debt markets expanded by 65% over the same period, to

---

economic relationship for policy variables such as the exchange rate regime, presence or lack of capital controls, the level of public debt, bank concentration or banking spreads.

<sup>8</sup> In Chile, assets held by pension funds rose gradually from the early 1970s to reach about 70% of GDP in 2004. However, similar holdings in other countries are much lower, ranging from 6% of GDP in Mexico to 14% of GDP in Argentina (Crabbe (2005)).

<sup>9</sup> Mohanty (2002) provides a comprehensive overview.

<sup>10</sup> This section relies on Jeanneau and Tovar (2006). An overview of bond markets in other regions is available in Turner (2006), Borensztein et al (2006a) and Jiang and McCauley (2004).

<sup>11</sup> Fully consistent cross-country data sets covering Latin American domestic debt markets were not available when this paper was drafted. Therefore, we assembled comparable data for the central government and non-financial corporate sectors of Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. Domestic issuance comprises the securities issued on local markets in local or foreign currency. Issuance by financial entities was excluded from the analysis owing to the limited coverage of available data.

\$264 billion. As a result of this growth, local fixed income markets have become the dominant source of funding for the public and private sectors (see Mathieson et al (2004)).

The current configuration of domestic debt markets in Latin America is characterised by six main features.

First, domestic debt markets vary widely in size (see Table 1). Brazil has by far the largest, with an outstanding stock of securities of \$583 billion at the end of 2005 (equivalent to 74% of its GDP). Mexico's is the second largest in absolute terms, with \$159 billion in outstanding securities, but it is substantially smaller than Brazil's in terms of GDP (21%). The debt markets of other countries are much smaller in absolute terms, although some of those markets are reasonably large relative to GDP.

Table 1  
Size of local fixed income markets in Latin America, 2005

	Stock of fixed income securities		Of which:		
			Government short-term	Government long-term	Non-financial corporate long-term
	USD billions	% of GDP	USD billions	USD billions	USD billions
Argentina	59.7	33	5.1	43.8	10.8
Brazil	583.4	74	226.7	318.2	38.5
Chile	39.8	35	9.2	17.3	13.3
Colombia	38.7	32	0.9	33.2	4.6
Mexico	158.5	21	52.0	89.1	17.4
Peru	7.9	10	1.4	4.3	2.2
Venezuela	7.2	5	3.4	3.7	0.1
<b>Total</b>	<b>895.2</b>	<b>41</b>	<b>298.7</b>	<b>509.6</b>	<b>86.9</b>
<i>Memo:</i>					
<i>United States</i>	<i>9,043.5</i>	<i>72</i>	<i>1,474.5</i>	<i>4,873.3</i>	<i>2,695.7</i>

Note: Securities issued by financial institutions are not included in non-financial corporate fixed income securities.

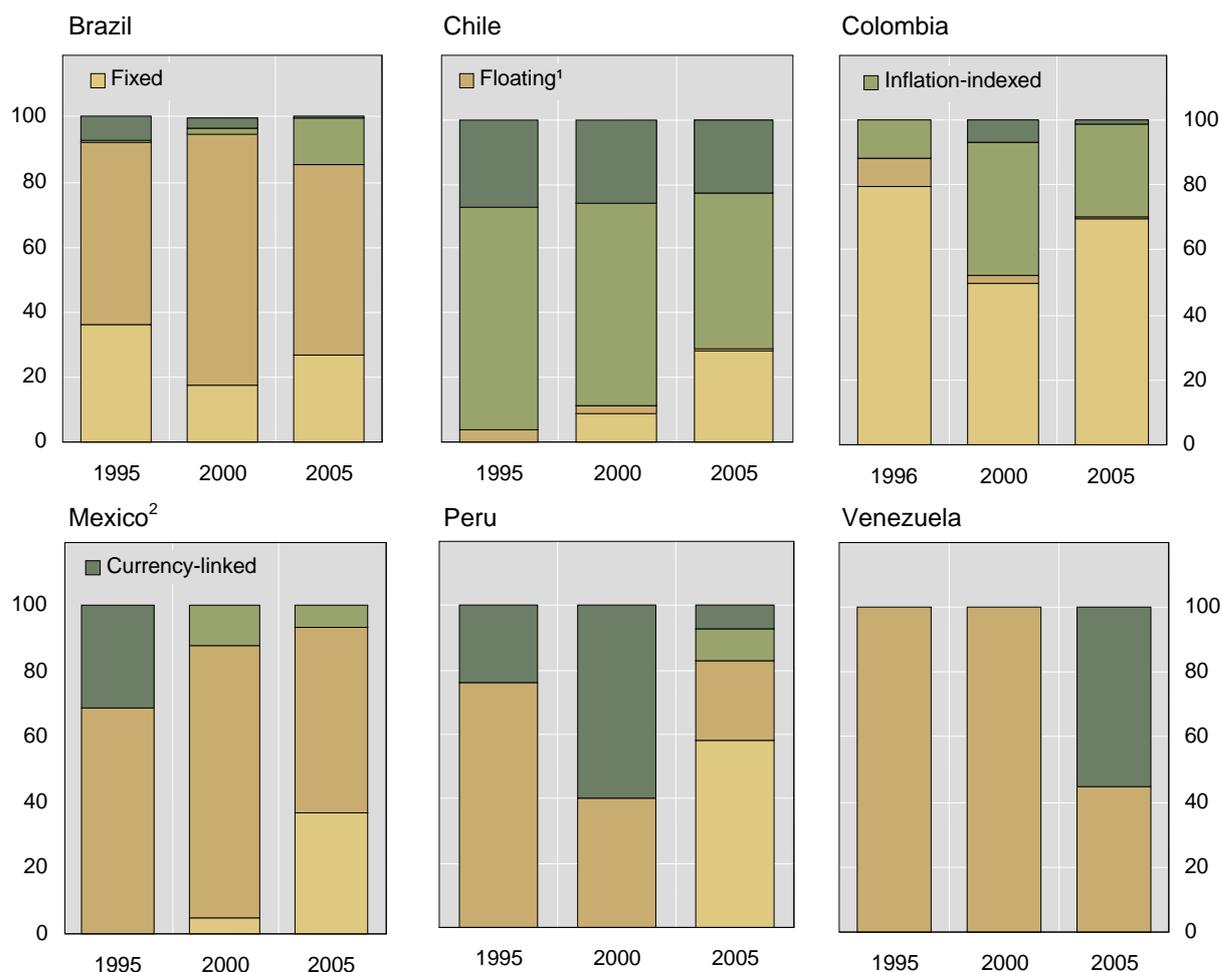
Sources: Fedesarrollo; national authorities; BIS.

Second, public sector issuers dominate domestic securities markets (see Figure 1). The central governments of the seven largest countries had issued marketable liabilities amounting to \$808 billion at the end of 2005. By comparison, corporate bond markets are much less developed. Although corporate markets may reach up to 40–50% of the respective government bond markets in some countries (eg Chile and Peru), they only total \$87 billion in the region as a whole. Moreover, even in countries where corporate markets are more developed, activity is restricted to top-tier companies. There has nevertheless been some progress in developing non-government bond markets, as illustrated by the expansion of securitisation in the region (see Box 1).

Third, short-term, floating rate and inflation-indexed securities continue to account for a large share of the outstanding stock of domestic government securities. However, there has been a significant change in the composition of government debt. As Figure 2 shows, currency-linked debt has been phased out in a number of countries, including Brazil and Mexico, as part of debt management programmes aimed at reducing vulnerabilities to external shocks.

The main exceptions to this trend are Argentina and Venezuela.<sup>12</sup> In addition, the relative share of fixed rate debt has increased in most countries. Progress has been particularly notable in Mexico, where the share of fixed rate securities amounted to about 40% at the end of 2005, versus less than 5% in 2000. Brazil has also made significant advances, with fixed rate bonds now accounting for close to 30% of marketable liabilities versus 15% in 2000.

Figure 2  
**Composition of central government debt in Latin America**  
 In per cent



<sup>1</sup> The floating rate grouping includes instruments with mixed characteristics. <sup>2</sup> Brems and Cetes are included as floating rate instruments.

Source: National data.

Fourth, there has been a gradual extension of the maturity structure of government debt in local currency. This has been achieved in part through a shift from short-term to fixed rate bonds and through a lengthening of the maturity of fixed rate bonds.<sup>13</sup> The progress made by

<sup>12</sup> In Argentina, which Figure 2 does not show, foreign currency denominated debt has been used to regain market access since the country's 2001 default.

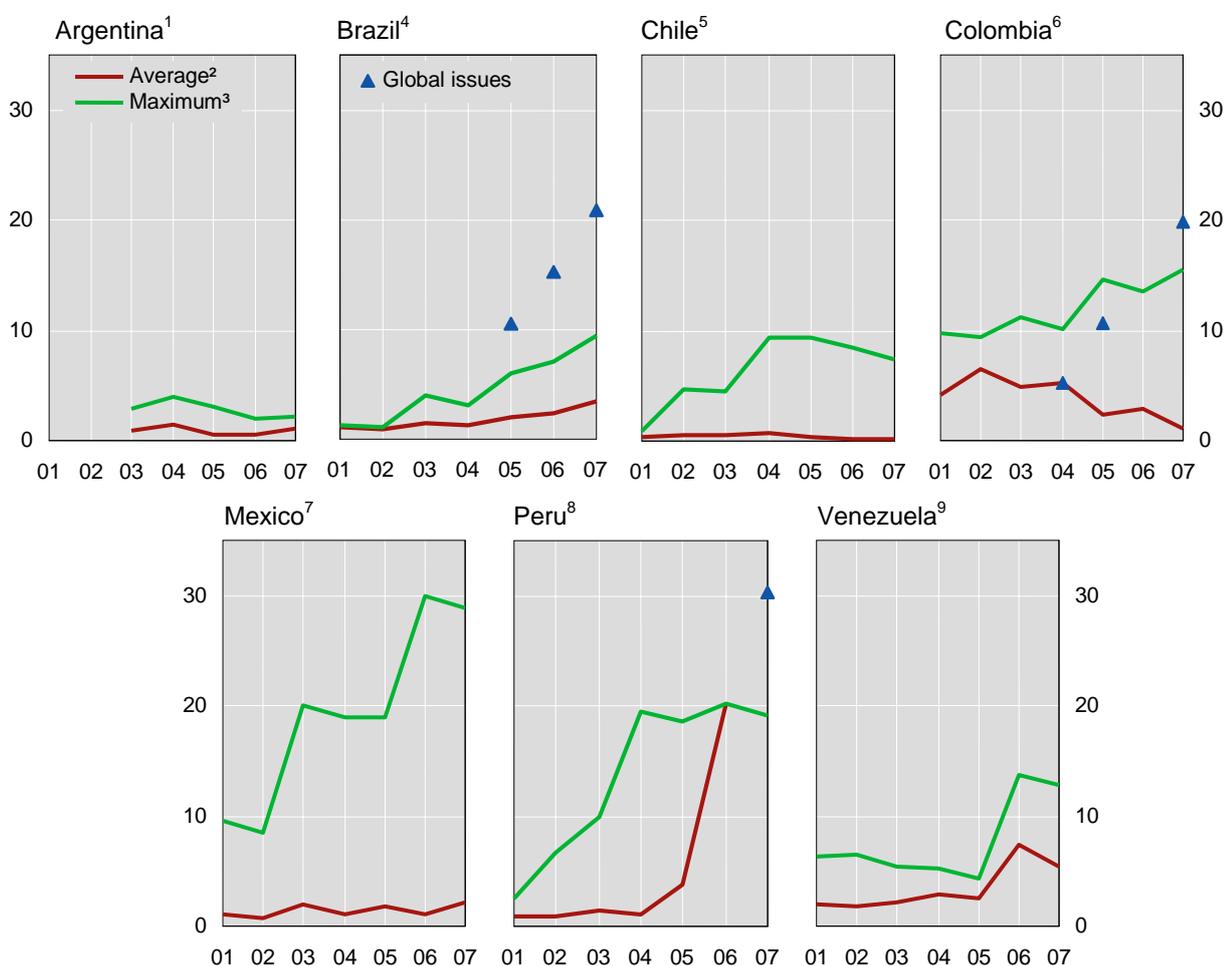
<sup>13</sup> A lengthening of the maturity of the part of debt that is indexed to short-term rates or inflation has also played a role in some countries.

governments in lengthening the maturity of their fixed rate debt in local currency is illustrated in Figure 3, which shows that most countries have been able to increase the maximum maturity of such debt. Since 2006 Mexico and Peru have been able to issue 30-year bonds, a significant development in the latter case given the country's high degree of dollarisation. Brazil has made important advances in recent years, as reflected by its 20-year global bond issues. Colombia, where it was common to issue 10-year debt, now issues at 15 and 20 years. Chile has issued securities out to 10 years as part of a process of reducing the degree of indexation of its government debt market. Longer-term issuance has also developed in Venezuela, owing in part to excess domestic liquidity resulting from capital controls. The wider availability of longer-dated bonds is beginning to provide a useful representation of the term structure of interest rates. Figure 4 plots available short- and long-term interest rates for countries in the region.

Figure 3

**Maturities of domestic fixed rate local currency government bonds**

In years



<sup>1</sup> Treasury bills, Lebac and Nobac; excluding the treasury bill issued on 14 February 2002. <sup>2</sup> Weighted average of new issues; weighted by the amounts issued (excluding global issues). <sup>3</sup> Remaining time to expiration at the end of the year (for 2007, 4 August 2007) of the issue with the longest outstanding maturity (excluding global issues); only bonds issued in 2001 or later. <sup>4</sup> LTN, NTN-F and global issues. <sup>5</sup> Central bank issues. <sup>6</sup> TES and global issues; only national government issues are included. <sup>7</sup> Cetes and government bonds. <sup>8</sup> Certificates of deposit, treasury bills and government bonds; excluding government bonds issued on 13 October 2004 and 31 January 2005. <sup>9</sup> Treasury bills and government bonds.

Sources: Bloomberg; national data.

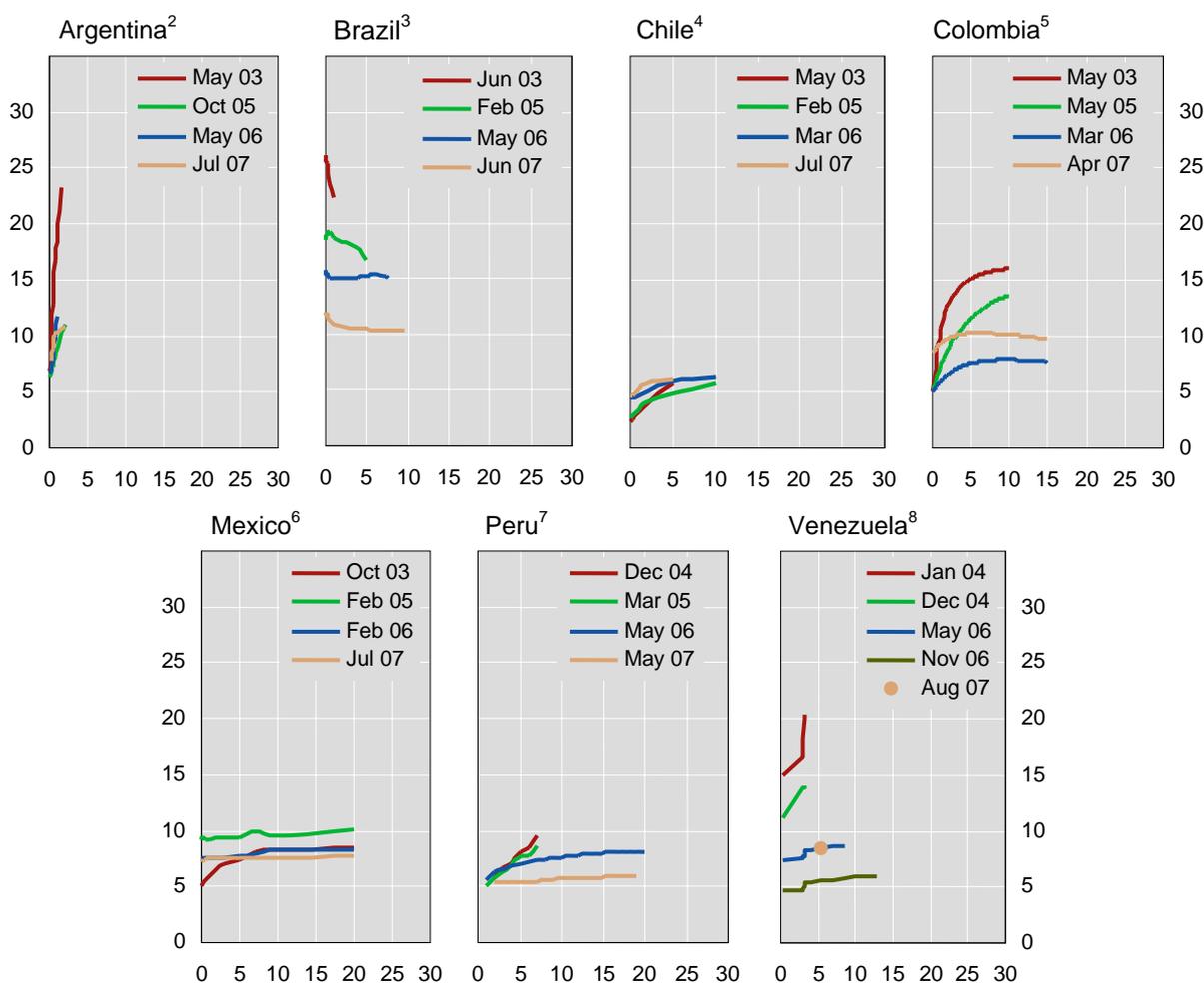
Notwithstanding this progress in the region, the amount of fixed rate securities issued at longer tenors remains in most cases limited, as reflected in the relative stability of the weighted average maturity of new issues (see Figure 3). The average maturity of new central government debt in the two largest markets, Brazil and Mexico, stood at 56 months and 31 months, respectively, at the end of 2006.

Fifth, secondary market trading in domestic bonds, a common measure of liquidity, has expanded in recent years (Figure 1, right-hand panel), but it remains low relative to mature markets (see Table 2). According to the Emerging Markets Trading Association (EMTA), yearly trading by its member banks in the domestic instruments of the region's seven largest countries amounted to \$1.3 trillion in 2005, or 1.6 times the outstanding stock of government securities. This is a lower volume of activity than in the more mature markets. Although the data are not entirely comparable, trading in US Treasury securities amounted to about \$139 trillion in the same year, or 22 times the relevant stock of securities. Within Latin America, moreover, there is considerable variation in secondary market activity. While annual turnover in Mexican securities is five times the outstanding stock, that in Peruvian and Venezuelan securities is less than the outstanding stock.

Figure 4

**Yield curves of domestic fixed rate local currency government bonds<sup>1</sup>**

In per cent



<sup>1</sup> Remaining maturities in years. <sup>2</sup> Lebac. <sup>3</sup> Swap rates; long-term; government bonds (NTN-F). <sup>4</sup> Central bank issues. <sup>5</sup> Zero coupon yield curve. <sup>6</sup> Cetes and government bonds. <sup>7</sup> Government bonds, secondary market. <sup>8</sup> Government bonds (Vebonos and TIF), last auction in the month.

Source: National data.

Table 2

**Indicators of secondary market liquidity  
in local government securities markets in 2005**

	Annual turnover		Bid-ask spread	Average size of transaction related to bid-ask spread
	Billions of US dollars	Percentage of outstanding securities		
Argentina	91.5	187	10–50 bp on fixed rate and inflation-indexed bonds	USD 1m
Brazil	433.0	79	5 bp on fixed rate bonds	BRL 10–50m
Chile	26.0	98	5 bp on fixed rate bonds	CLP 100m
			5–10 bp on inflation-indexed bonds	UF 100,000
Colombia	45.0	132	3–5 bp on fixed rate bonds	COP 2bn
Mexico	696.7	494	3–5 bp on fixed rate bonds	MXN 50–100m
			5–15 bp on inflation-indexed bonds	MXN 5–10m
Peru	2.6	46	10–20 bp on fixed rate bonds	USD 1m
Venezuela	2.8	39	50–100 bp on floating rate bonds	VEB 2.4bn
<b>Total</b>	<b>1,297.6</b>	<b>160</b>	...	...
<i>Memo:</i>				
<i>United States</i>	<i>138,756.0</i>	<i>2,186</i>	<i>0.8–1.6 bp on fixed rate bonds</i>	<i>USD 25m</i>

Note: Annual turnover data for Latin American countries correspond to secondary market transactions reported by major dealers and money management firms to the Emerging Markets Trading Association (EMTA). Annual turnover for the United States is based on daily inter-dealer transactions in US Treasury securities as reported in the Statistical Supplement to the Federal Reserve Bulletin.

Sources: Sack and Elsasser (2004); Federal Reserve Board; IMF; Citigroup; EMTA; JPMorgan Chase; BIS.

Market liquidity has other important dimensions, such as the tightness of the market, ie the efficiency with which market participants can trade.<sup>14</sup> As shown in Table 2, local markets for fixed rate government securities do not appear to be very tight relative to the US market. Indeed, bid-ask spreads, which provide an idea of the costs incurred by market participants in executing transactions, are significantly higher in Latin America than in the United States.<sup>15</sup>

<sup>14</sup> Resilience, ie the market's ability to absorb a shock, is equally important. However, it is difficult to assess it without longer time series. See CGFS (2007).

<sup>15</sup> As a reference, bid-ask spreads in government bond markets in Asia range from 1 to 2 basis points in India, Korea and Singapore, and to 7 basis points in Indonesia. See Jiang and McCauley (2004).

Box 1

**Securitisation in Latin America**

Securitisation is a recent but rapidly expanding phenomenon in Latin America.<sup>1</sup> Several forces have created opportunities for the expansion of structured finance, including the existence of pressures to improve banks' return on assets, the introduction of better adapted legal frameworks and bankruptcy procedures, a resumption of demand for residential housing and commercial office space and institutional investors' need for higher-quality assets.

The exact amount of structured transactions is not easy to calculate owing to the lack of standardised definitions and centralised reporting. The major international rating agencies are the main source of data on this market segment. According to Moody's, domestic securitised issuance in Latin America has exceeded cross-border business since 2003. Domestic and cross-border transactions in the region amounted to \$13.6 billion and \$1.7 billion, respectively, in 2006. Brazil, Mexico and Argentina accounted for 40%, 32% and 18% of the total volume of domestic business. Mortgage-backed securities (MBSs), auto loans, consumer loans and credit-linked notes represented 21%, 16%, 14% and 13% of domestic activity, respectively.

**Issuance of domestic asset-backed securities in Latin America**

In millions of US dollars

	2000	2001	2002	2003	2004	2005	2006
Argentina	1,590	701	130	226	525	1,790	2,550
Brazil	184	88	106	1,031	1,652	3,911	5,542
Chile	173	220	430	380	293	873	325
Colombia	55	63	597	510	799	323	674
Mexico	65	427	414	604	5,444	4,846	4,430
Peru	37	94	7	60	163	295	71
<b>Total</b>	<b>2,104</b>	<b>1,593</b>	<b>1,684</b>	<b>2,811</b>	<b>8,876</b>	<b>12,038</b>	<b>13,592</b>

Source: Moody's.

Brazil's domestic market for securitised assets only took off in 2003 but is currently the most active in Latin America. Issuance reached \$5.5 billion in 2006, compared with \$1 billion in 2003. The development of this market was initially hampered by the high cost of establishing special purpose vehicles as well as investors' initial indifference to such securities given the ready availability of high-quality government paper. However, in recent years investment vehicles known as Fundos de Investimentos em Direitos Creditórios have become increasingly popular. Such funds provide companies with an alternative to traditional bank credit by enabling them to securitise their receivables.

The Mexican domestic market for securitised assets only emerged in 2000. Currently, it is the second most active in the region. Issuance in Mexico amounted to \$4.4 billion in 2006. Much of the activity in recent years has been due to very large transactions backed by loans held by the Instituto para la Protección al Ahorro Bancario (IPAB), the agency set up in 1999 to manage the debt resulting from the rescue of the banking sector.<sup>2</sup> So far, aside from the deals enacted by IPAB, most transactions launched in the Mexican market have securitised bridge loans for construction and residential mortgages. In fact, MBSs represent 38% of the total volume issued. This activity in the MBS market is associated with the activity by Sociedad Hipotecaria Federal (SHF), a state-owned development bank that began its operations in late 2001. SHF has worked to develop a cohesive market for MBSs. As such, it has encouraged issuers to introduce bonds with

<sup>1</sup> See Tovar and Scatigna (2007) for a more detailed discussion.

<sup>2</sup> Transactions launched by IPAB amounted to \$4.1 billion in 2004 and \$2.8 billion in 2005. In 2006 IPAB did not introduce any issues.

Box 1 (cont)

**Securitisation in Latin America**

homogeneous characteristics and has played an active role as intermediary and liquidity provider in the nascent secondary market for MBSs.

Argentina's market for securitised assets largely dried up in 2001 and 2002 but began to recover in 2003. Indeed, the Argentine market's expansion has been noteworthy in 2005 and 2006, with issuance jumping to \$2.5 billion from \$130 million in 2002.

Again, there are major differences within the region. While in Colombia and Mexico bid-ask spreads are narrow, they remain quite wide in Argentina, Peru and Venezuela.

Finally, there are currently no actively traded derivative contracts on government bond benchmarks in the region, but trading in short-term interest rate or swap contracts is developing rapidly in the major countries. In Brazil, position-taking in fixed income markets is conducted largely through overnight futures and swaps rather than cash market assets.<sup>16</sup> This accounts for the sharp expansion in exchange-traded turnover observed in recent years, with activity reaching \$8.8 trillion in 2006 against \$2.6 trillion in 2000.<sup>17</sup>

In Mexico, where exchange-traded activity on fixed income assets does not extend beyond interbank rates, business amounted to \$1 trillion in 2005 relative to almost nothing in 2000. However, over-the-counter (OTC) currency forwards and swaps are reported to be increasingly popular in that country. Such instruments are helping foreign investors and issuers hedge their currency and interest rate exposures to local currency bonds, thus facilitating their entry into the market for such securities.<sup>18</sup>

### **3.3 Factors driving the recent expansion of domestic bond markets**

The desirability of local currency debt as an asset class has been enhanced by a number of factors, including the improvement in policies and performance in the region as well as the global process of portfolio diversification.<sup>19</sup>

#### **3.3.1 Endogenous factors: changes in government policies**

The structure of domestic government and private sector liabilities contributed to a worsening of the crises experienced by countries in the region during the 1990s and 2000s. During those episodes, the withdrawal of foreign investment created severe downward pressures on the currencies of many countries, forcing the authorities to raise policy rates sharply. Given the short maturity of government and private sector debt, borrowing costs rose significantly. This worsened fiscal positions and corporate balance sheets. Countries that had relied heavily on foreign currency-related debt were also hit hard. The drop in the value of

---

<sup>16</sup> See Amante et al (2007) for a discussion of the role of derivatives in the Brazilian market.

<sup>17</sup> By comparison, turnover on US exchanges reached about \$750 trillion in 2005.

<sup>18</sup> Local currency debt markets have stimulated derivatives markets in Mexico. Taking advantage of the demand for highly rated peso paper, foreign financial institutions have issued a number of international peso-denominated bonds. Since such issuers tend to swap the proceeds of their issues into other currencies, they have provided a natural counterpart to foreign investors wishing to hedge peso paper. The Mexican peso is now one of the few emerging market currencies in which there is active OTC derivatives trading (BIS (2005)).

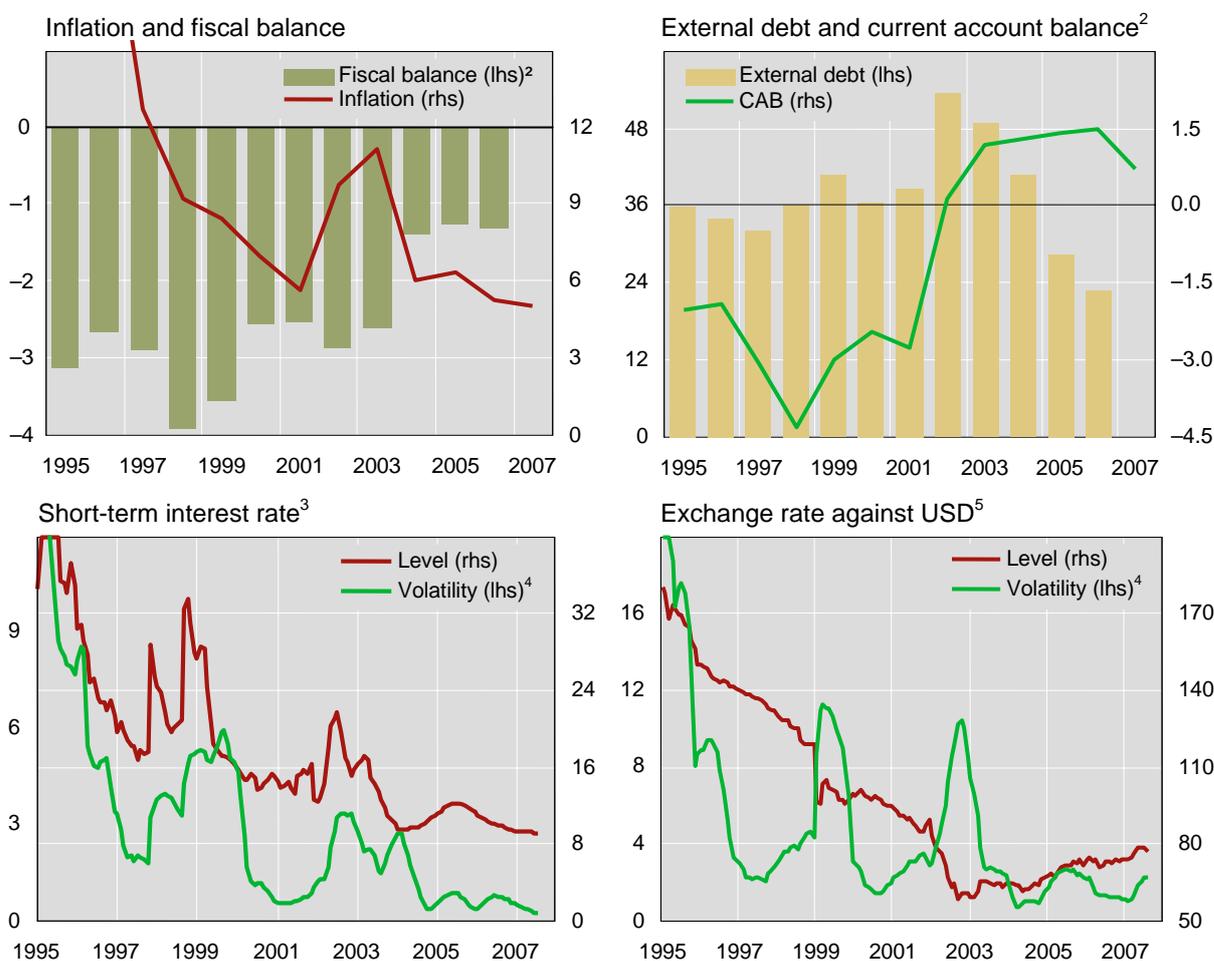
<sup>19</sup> See Borensztein et al (2006b) for an econometric analysis aimed at identifying factors associated with the underdevelopment of Latin America's bond markets. Also see discussion in footnote 7.

exchange rates resulted in an explosive growth in the local currency value of government and corporate liabilities. Hence, developing viable local bond markets to secure a more stable source of local currency funding became an important objective of government policies.

An important element in strengthening the demand for domestic debt has been the pursuit of stabilising macroeconomic policies. New monetary policy frameworks, often based on inflation-targeting regimes, have led to a sustained reduction in inflation (Figure 5). At the same time, governments have been broadly successful in bringing fiscal deficits under control. The consolidation of fiscal accounts and the reduction in inflation have contributed to lowering the volatility of domestic short-term interest rates.

Figure 5

**Economic indicators for Latin America<sup>1</sup>**



<sup>1</sup> Weighted average of Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela based on 2000 GDP and PPP exchange rates. <sup>2</sup> As a percentage of GDP. <sup>3</sup> Three-month; in per cent. <sup>4</sup> Twelve-month rolling standard deviation. <sup>5</sup> 1995–2003 = 100; an increase indicates an appreciation.

Sources: IMF; Economic Commission for Latin America and the Caribbean; JP Morgan; Latin Focus; national data.

Partly as a result of this better environment, domestic interest rates are increasingly determined by local economic developments rather than by external factors. In fact, in recent periods in some countries, such as Brazil and Mexico, the local yield curve has often “decoupled” from the US yield curve.

## Box 2

### **Global government bonds in local currency: an overview<sup>1</sup>**

Several Latin American countries, both at the government and corporate levels, have issued global bonds denominated in local currency during the last few years (see Box Table 1).<sup>2</sup> This box provides an overview of such issues and discusses the benefits and the risks that they may entail.

In November 2004, the Colombian government issued COP 954.2 billion (\$375 million) worth of global bonds denominated in domestic currency. These bonds were issued under very favourable conditions for the borrower, as reflected in a coupon of 11.75% and a maturity of over five years. The demand for these bonds was strong, reaching \$1.1 billion. US investors reportedly purchased 65% of the bonds, Europeans 30% and Latin Americans 5%. The success of the issue was further reflected by its reopening for COP 293.7 billion (\$125 million) in January 2005. Both tranches of the bonds were issued at lower cost than in the domestic market. In February 2005, a new issue was made with very similar conditions but with a longer maturity (10.7 years). The cost of external financing in this case was also more favourable than that of domestic financing. A new issue was again made in 2007.

In September 2005, Brazil issued BRL 3.4 billion (\$1.5 billion) of global bonds with a maturity of over 10 years and a 12.5% coupon. The Brazilian global issue was oversubscribed several times and the distribution was truly international, being purchased by investors from Europe and the United States. The issue contributed to extend the maturity of the yield curve for real-denominated fixed rate government debt, which was then limited to seven years in the domestic market. In May 2007, Brazil issued 20-year real-denominated global bonds, securing the lowest-ever yield for real denominated debt securities (thanks in part to an upgrade by Fitch Ratings).

More recently, Peru issued a 30-year global bond in local currency denominated in soles at a low cost, thus allowing the country to extend its yield curve in local currency.

The Brazilian, Colombian and Peruvian issues share some important features. First, the securities have long maturities. Second, the bonds are not indexed to inflation but offer a fixed interest rate, transferring both inflation and exchange rate risk from the government to investors. At the same time, with interest and principal settled in US dollars, the securities free investors from any risks associated with exchange controls.

In Brazil and Colombia, institutional factors have been restricting the entry of foreign investors into domestic markets (eg registration requirements and withholding taxes or capital controls).<sup>3</sup> In many cases, global bonds have allowed foreigners to short-circuit impediments to foreign purchases in local markets. The global bonds considered here all fall under the jurisdiction and laws of the state of New York, which makes them more attractive for international investors relative to domestic bonds in the event of default.

In the case of Colombia, global bonds may have an important side benefit in terms of financial stability. The financial system has a heavy exposure to domestic government debt (TES), a counterpart to the reduced foreign exchange exposure of the public sector.<sup>4</sup> This situation makes the system highly vulnerable given that any adverse shocks resulting from currency devaluations

<sup>1</sup> See Tovar (2005) for a more detailed analysis.

<sup>2</sup> Global bonds are debt securities issued simultaneously in the international and domestic markets, in a variety of currencies, and settled through various worldwide clearing systems.

<sup>3</sup> In Brazil, investment can take place only after registration with the Brazilian Securities and Exchange Commission and with the central bank. Until February 2006 investment was subject to a 15% capital gains tax. However, other taxes still apply. In Colombia, restrictions apply for foreigners willing to invest in domestic paper. For instance, an investment trust must be established and taxes must be paid depending on the tax status of the investors (currently, the income tax rates can go up to 35%; moreover, a 10% surcharge applies which raises the maximum rate to 38.5%; a 0.4% financial transaction tax is also in place). Between the end of 2004 and June 2006, capital controls established a minimum period of one year for all portfolio investment.

<sup>4</sup> The exposure of the Colombian financial system to government securities increased from 6% in 1998 to 45% in 2005 (Maiguashca (2005)).

Box 2 (cont)

**Global government bonds in local currency: an overview<sup>1</sup>**

and higher domestic interest rates could worsen the market value of the securities.<sup>5</sup> In addition, it could result in a “trade-off” for the central bank as it could be constrained to adjust interest rates up.<sup>6</sup> Under such circumstances, global bonds may contribute to increase a country’s risk-sharing opportunities. In particular, such bonds would not only transfer the currency risk to foreign investors but also could “hedge” the domestic financial system from an excessive exposure to government securities.

**Selected international government debt in local currency**

Country	Issue date	Maturity date	Currency	Amount issued <sup>1</sup>	Coupon rate	Rating: Fitch/Moody’s/S&P	Market
Brazil	Sep 2005	Jan 2016	BRL	1,485	12.5	BB/Ba2/BB	GLOBAL
Brazil	Sep 2006	Jan 2022	BRL	1,382	12.5	BB/Ba2/BB	GLOBAL
Brazil	Feb 2007	Jan 2028	BRL	1,051	10.25	BB/Ba2/BB	GLOBAL
Brazil	May 2007	Jan 2028	BRL	371	10.25	BB+/Ba2/BB	GLOBAL
Colombia <sup>2</sup>	Nov 2004	Mar 2010	COP	493	11.75	BB/Ba2/BB+	GLOBAL
Colombia	Feb 2005	Oct 2015	COP	1,102	12	BB/Ba2/BB+	GLOBAL
Colombia	Jun 2007	Jun 2027	COP	999	9.85	BB+/Ba2/BB+	GLOBAL
Peru <sup>3</sup>	Jul 2007	Aug 2037	PEN	1,240	6.9	BBB–/Baa3/BBB–	GLOBAL
Uruguay <sup>3,4</sup>	Oct 2003	Oct 2006	UYU	290	10.5	B+/WR/NR	GLOBAL
Uruguay <sup>3</sup>	Aug 2004	Feb 2006	UYU	255	17.75	B+/WR/NR	GLOBAL
Uruguay <sup>3,4</sup>	Sep 2006	Sep 2018	UYU	401	5	B+/B1/B+	GLOBAL
Uruguay <sup>3,4</sup>	Oct 2006	Sep 2018	UYU	296	5	B+/B+/B+	GLOBAL
Uruguay <sup>3</sup>	Apr 2007	Apr 2027	UYU	504	4.25	B+/B1/B+	GLOBAL
Uruguay <sup>3,4</sup>	Jun 2007	Jun 2037	UYU	500	3.7	BB–/B1/B+	GLOBAL

Note: A private placement avoids the cost of registration with the Securities and Exchange Commission (which is required for a global issue), and has more restrictive protective covenants that are easier to renegotiate in the event of a default. Also, the cost of distributing bonds is lower.

<sup>1</sup> Calculated using the monthly average exchange rate when official numbers were not available; in millions of US dollars. <sup>2</sup> This issuance was reopened in January 2005 for an additional amount of \$125 million. <sup>3</sup> Principal and interest paid in US dollars. <sup>4</sup> These bonds are indexed to inflation.

Source: Bloomberg.

However, “going global” in local currency is probably a “second best” solution for broadening the pool of investors. A notable downside is that fragmenting liquidity global bonds in local currency may have an adverse effect on the development of domestic debt markets. Despite this potential disadvantage, the Colombian government has been promoting the trading of global bonds.

In the case of a smaller economy, such as Uruguay, global bonds in local currency may have had a more favourable influence by setting a benchmark for the development of domestic securities. Uruguay introduced such bonds in the midst of a financial crisis but has slowly extended the maturity of new issues. As such, they offer an interesting case study of how to rebuild financial markets following a crisis.

<sup>5</sup> The concern is not a loss stemming from a day-to-day fall in TES price, but rather a rapid and persistent increase in interest rates such as those recorded in Colombia in 2002.

<sup>6</sup> Section 5 discusses this in detail. See also Vargas (2006) and Maiguashca (2005).

Another significant change in policy has been the shift to more flexible exchange rate regimes, which has reduced the risk of sudden “earthquake” currency movements. In addition, this shift has contributed to make the risks associated with exchange rate fluctuations more explicit. As a result, issuers have been more reluctant to borrow in foreign currency given the higher risk implied by such borrowing, thus strengthening the relative attractiveness of domestic issuance.

At the microeconomic level, the reform of institutional investment has played an important role in boosting demand for longer-term debt. Most countries have implemented reforms of their pension systems for private sector employees whereby existing defined benefit systems have been replaced by compulsory defined contribution plans that are funded by individuals and managed by private administrators. Moreover, countries have been widening the range of assets that pension funds can invest in.<sup>20</sup> Governments have also implemented a host of other microeconomic initiatives aimed at improving demand for debt, including a removal of restrictions on foreign investment and a simplification of investment regulations.<sup>21</sup> In addition, they have supported the development of derivatives and repurchase markets.

Initiatives have also been taken to improve the supply of government debt. While the actual measures introduced have varied from country to country, they have included some combination of the following elements: a shift to the domestic financing of fiscal deficits, a move to greater predictability and transparency of debt issuance, a lengthening of the maturity structure of government debt and the development of liquid domestic benchmarks.

Lastly, the authorities have taken steps to develop corporate bond markets, in part through improvements to legislation on corporate governance. In this regard, discussions concerning the adoption of international accounting standards have constituted a positive opportunity. The implementation of Basel II has also created favourable externalities regarding the further development of external credit risk assessment (BIS (2007)).

### **3.3.2. Exogenous factors: favourable external environment and long-term portfolio diversification**

The emergence of domestic debt markets in the region has also been supported by an unusually favourable international environment. Three elements stand out.

First, high commodity prices have fuelled economic growth and helped bring external accounts into balance. Such improved economic fundamentals have often created expectations of further currency appreciation, which have increased the attraction of financial assets issued by local entities. Second, the prevalence of easy monetary conditions in the major industrial countries in the first half of the 2000s led to a sustained decline in short- and long-term interest rates globally (Figure 6), which prompted international investors to return to emerging debt markets in a search for higher yields.<sup>22</sup> In turn, the search for yield eased financing conditions along the maturity spectrum. This favourable climate encouraged investors to purchase local securities and thus facilitated primary market issuance. Third, those favourable cyclical factors have been reinforced by a more secular process of integration between mature and emerging economies (Wooldridge et al (2003)). This process

---

<sup>20</sup> In Mexico, for instance, quantitative limits on investment in selected private sector securities were recently lifted and replaced by ratings-based limits.

<sup>21</sup> Although capital controls have been re-introduced recently in Argentina, Colombia and Venezuela.

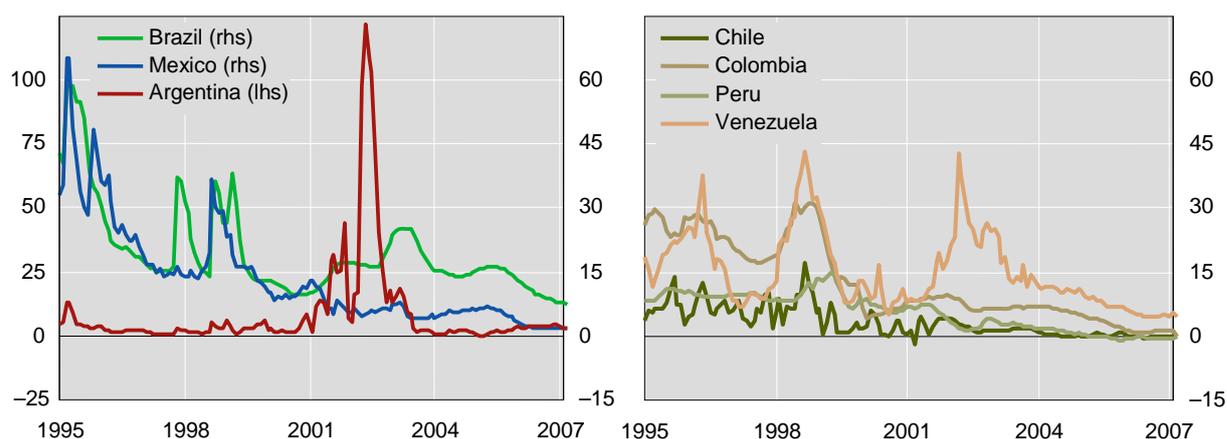
<sup>22</sup> Although there are no comprehensive data on non-resident investor holdings of domestic bonds, the sustained increase in the share of domestic bonds in the total volume of trading by international financial intermediaries reported by the Emerging Markets Trading Association (EMTA) suggests that foreigners have become more involved in domestic bond markets in the region (see Figure 1, right-hand panel).

includes the growing availability of low-cost and real-time information about the performance of countries and firms. This has significantly weakened the information asymmetries between financial market participants that traditionally created a home bias in investment. At the same time, the development of electronic trading technologies has greatly reduced transaction costs and processing times, further broadening market participation. Lastly, the entry of foreign financial institutions in domestic markets has provided a new channel for investment in the region.

However, questions remain as to whether this investment process is temporary or permanent. There are good reasons to believe that the factors supporting the development of bond markets in Latin America are largely of a permanent nature – in particular, those associated with improvement in policies and economic performance. Notwithstanding this improvement, the expansion of local bond markets depends in part on the sustainability of the global process of portfolio diversification. The reduction in nominal interest rate differentials observed in recent years would have been expected to weaken the search for yields, but capital continued to flow strongly to the region. However, the extent to which domestic bond markets will constitute a dependable source of funding for the region remains to be tested under less auspicious market conditions.

Figure 6

**Interest rate differential<sup>1</sup>**



<sup>1</sup> Three-month rate; domestic rate minus US rate, in per cent.

Sources: IMF; national data.

Table 3 presents more general evidence concerning the diversification benefits offered by Latin American domestic bond markets relative to other asset classes in global portfolios, at least from the point of view of US dollar-based investors. Such benefits have been evident given the relatively low return correlations since January 2003 of Latin American local currency bonds with: (a) Asian and European emerging market local currency bonds (0.48 and 0.30, respectively); (b) the foreign currency EMBI index (0.52); and (c) 10-year US Treasury notes (0.18). This last set of correlations has been lower for Latin American local currency bonds than the corresponding sets for Asian and European local currency instruments (0.26 and 0.29, respectively) or the EMBI Global Diversified index (0.67). The final row of Table 3 indicates that these diversification benefits did not come at the cost of lower returns over the sample period. From 2003, cumulative returns on local Latin American fixed income securities exceeded those of other emerging markets as local nominal yields declined and currencies appreciated. Complementary evidence is reported in Table 4. The Sharpe ratio shows that local currency bond markets in Latin America offered during the past few years had higher excess returns in dollars per unit of risk than investing in other markets such as Asia or Europe (0.38 versus 0.17 or 0.31). However, in 2006 the attractiveness of

Latin American markets declined on average, due in part to the sharp market adjustment observed in Colombia.

Table 3  
Domestic bond market correlations and returns

January 2003–October 2007

Correlations		GBI-EM <sup>1</sup>						EMBI <sup>2</sup>	10-yr US Treasury bond	
		Brazil <sup>3</sup>	Chile	Colombia	Mexico	Lat Am	Asia			Europe
GBI-EM <sup>1</sup>	Brazil <sup>3</sup>	1.00								
	Chile	0.38	1.00							
	Colombia	0.50	0.28	1.00						
	Mexico	0.59	0.49	0.42	1.00					
	Lat Am	0.85	0.49	0.69	0.85	1.00				
	Asia	0.44	0.18	0.45	0.31	0.48	1.00			
	Europe	0.25	0.33	0.30	0.25	0.30	0.49	1.00		
EMBI <sup>2</sup>		0.49	0.35	0.40	0.51	0.52	0.45	0.43	1.00	
Ten-year US Treasury bond		0.06	0.10	0.09	0.18	0.13	0.26	0.29	0.67	1.00
Returns										
2003		21.70	27.67	19.46	7.12	16.45	7.91	14.19	22.31	1.23
2004		20.86	11.89	43.45	3.10	12.92	3.09	27.70	11.30	4.84
2005		37.63	18.18	23.01	23.05	23.58	5.17	4.95	10.80	2.23
2006		31.71	3.16	8.01	10.91	18.89	12.49	14.91	9.77	1.47
Cumulative		293.26	91.34	156.81	54.29	121.34	42.98	104.51	71.19	14.76

<sup>1</sup> GBI-EM Broad Diversified. <sup>2</sup> EMBI Global Diversified. <sup>3</sup> Sample starting in May 2003.

Source: Authors' calculations, based on JPMorgan Chase and Datastream data.

Overall, diversification benefits depend in part on whether yield correlations with other fixed income instruments remain low during periods of stress. There is some supportive empirical evidence that this may be the case (Bayliss (2004)). But there are not enough data to test the stability of correlations over more than a limited time span. An extended episode of significantly less favourable market conditions would be required to arrive at more definite conclusions.

Table 4  
**Domestic bond market Sharpe ratios<sup>1</sup>**  
 January 2003–October 2007

	GBI-EM <sup>2</sup>							EMBI <sup>3</sup>
	Brazil <sup>4</sup>	Chile	Colombia	Mexico	Lat Am	Asia	Europe	
2003	0.70	0.30	0.26	0.13	0.30	0.23	0.13	0.84
2004	0.24	0.27	0.68	0.03	0.28	-0.12	0.53	0.50
2005	0.76	0.32	0.76	0.60	0.84	0.04	0.00	0.41
2006	0.26	0.20	0.01	0.23	0.26	0.43	0.33	0.38
2003–2007	0.48	0.29	0.30	0.20	0.38	0.17	0.31	0.45

<sup>1</sup> US 10-yr treasury bond as a benchmark.    <sup>2</sup> GBI-EM Broad Diversified.    <sup>3</sup> EMBI Global Diversified.  
<sup>4</sup> Sample starting in May 2003.

Source: Authors' calculations based on JPMorgan Chase and Datastream data.

## 4. Conclusions

Latin American economies have made significant progress in developing their domestic bond markets. However, important challenges remain. The most pressing are the need to reduce the vulnerability of structures to refinancing risk and to increase secondary market liquidity (as will be discussed in more detail in the accompanying chapter, "Financial stability implications of local currency bond markets: an overview of the risks"). Moreover, the extent to which such markets constitute a dependable source of funding remains to be tested. Although the region appears today to be less vulnerable to financial shocks, less auspicious market conditions could expose these incipient domestic markets to additional unforeseen pressures. In this respect, policy makers should encourage the further development of such markets.

## References

- Amante, A, M Araujo and S Jeanneau (2007): "The search for liquidity in the Brazilian domestic government bond market", *BIS Quarterly Review*, June, pp 69–82.
- Bank for International Settlements (BIS) (2005): *Foreign exchange and derivatives market activity in 2004, Triennial Survey*, March.
- (2007): *Evolving banking systems in Latin America and the Caribbean: challenges and implications for monetary policy and financial stability*, BIS Papers, no 33.
- Bayliss, J (2004): "Emerging markets external debt as an asset class", JPMorgan Emerging Markets Research.
- Borensztein, E, B Eichengreen and U Panizza (2006a): "A tale of two markets. Bond market development in East Asia and Latin America", mimeo.
- (2006b): "Building bond markets in Latin America", paper prepared for the Inter-American Development Bank Network on the Growth of Corporate Markets in Latin America.

- Burger, J D and F E Warnock (2003): "Diversification, original sin and international bond portfolios", International Finance Discussion Papers, no 755, Federal Reserve Board, April.
- Committee on the Global Financial System (CGFS) (2007): *Financial stability and local currency bond markets*, CGFS publication no 28.
- Crabbe, C (2005): *A quarter century of pension reform in Latin America: lessons learned and next steps*, Inter-American Development Bank.
- Eichengreen, B and R Hausmann (eds) (2005): *Other people's money: debt denomination and financial instability in emerging market economics*, The University of Chicago Press.
- Goldstein, M and P Turner (2004): *Controlling currency mismatches in emerging markets*, Institute for International Economics, Washington DC.
- Inter-American Development Bank (IDB) (2006): *Living with debt: how to limit the risks of sovereign finance*, 2007 issue of *Economic and Social Progress Report*, October.
- Jeanneau, S and C Tovar (2006): "Domestic bond markets in Latin America: achievements and challenges", *BIS Quarterly Review*, June, pp 51–64.
- Jiang, G and R McCauley (2004): "Asian local currency bond markets", *BIS Quarterly Review*, June, pp 67–79.
- Maiguashca, A (2005): "Colombian issuance of local currency debt abroad: some notes on the opportunities and challenges in the current juncture", paper prepared for the XX IADB Meeting of the Latin American Network of Central Banks and Finance Ministries, October.
- Mathieson, D, J Roldos, R Ramaswamy and A Ilyina (2004): *Emerging local securities and derivatives markets*, World Economic and Financial Surveys, International Monetary Fund, Washington DC.
- Mohanty, M (2002): "Improving liquidity in government bond markets: what can be done?", *BIS Papers*, no 11, pp 49–80.
- Sack, B and R Elsasser (2004): "Treasury inflation-indexed debt: a review of the US experience", *Economic Policy Review*, vol 10, no 1, May, pp 37–63.
- Scatigna, M and C Tovar (2007): "Securitisation in Latin America", *BIS Quarterly Review*, pp 71–82, September.
- Tovar, C (2005): "International government debt denominated in local currency: recent developments in Latin America", *BIS Quarterly Review*, December, pp 109–18.
- Turner, P (2002): "Bond markets in emerging market economies", *BIS Papers*, no 11, pp 1–12.
- (2006): "Local currency bond markets in emerging markets: what are the links with financial stability?", paper prepared for the Latin American and Caribbean Economic Association conference, November, Mexico City.
- Vargas, H (2006): "Public debt market risk: a constraint on monetary policy? The effects on the financial system and on monetary policy: the case of Colombia", *BIS Papers*, no 28, pp 189–201.
- Wooldridge, P, D Domanski and A Cobau (2003): "Changing links between mature and emerging financial markets", *BIS Quarterly Review*, December, pp 45–54.
- World Bank (WB) (2001): "Developing government bond markets: a handbook", special spring meeting edition.

# Financial stability implications of local currency bond markets: an overview of the risks<sup>1</sup>

Serge Jeanneau and Camilo E Tovar

## 1. Introduction

Latin American countries have made considerable progress in developing their local currency bond markets. With more sizeable local bond markets come improved efficiency of financial intermediation, diversification of intermediation, reduction in the concentration of risks in the banking sector and financing of fiscal deficits in a non-inflationary manner. In addition, the more developed local currency debt markets in these countries should help mitigate important risks and sources of vulnerabilities, eg by reducing systemic instability associated with currency and maturity mismatches. A growing body of evidence says that the development of local currency bond markets, which has gone further than many had expected a decade ago, has strengthened the stability of local financial systems in the emerging market economies as a whole.<sup>2</sup>

Notwithstanding the substantial benefits of local currency bonds, it is useful to consider potential risks that may arise from the rapid development of such instruments. Such risks may initially be hidden but should not be underestimated. An important issue to consider is whether the replacement of long-term foreign currency borrowing with shorter-term borrowing has not simply replaced currency risk with refinancing risk. A second concern is whether insufficient market liquidity may result in greater volatility during times of stress. A third issue is whether a narrow investor base may create systemic risks. Finally, we must ask whether the expansion of domestic issuance may have taken place without the existence of a proper infrastructure and/or regulations.

This chapter discusses the extent to which the development of local currency bond markets may affect financial stability. It starts by addressing a key question: whether the development of bond markets has reduced the vulnerability associated with currency and maturity mismatches. Next, it offers an analysis of the financial stability implications associated with the structure of local debt markets. Following this is a section drawing some implications for risk management, with a particular emphasis on liquidity and settlement risk. A final section concludes.

## 2. Currency and maturity mismatches

The development of domestic bond markets in Latin America has resulted from concerted efforts by the authorities to reduce their countries' vulnerabilities to external shocks. Such

---

<sup>1</sup> The views expressed are those of the authors and do not necessarily reflect those of the BIS. We thank Philip Turner and Michela Scatigna for their comments, Rodrigo Mora for research assistance and Alejandra Gonzalez for editorial support.

<sup>2</sup> This topic has been examined by a Committee on the Global Financial System (CGFS) Working Group on "Financial stability and local currency bond markets" (see BIS (2007)). This paper draws partially on material prepared for the Working Group, but all opinions expressed are our own.

vulnerabilities were often related to the difficulty faced by sovereigns and corporates in issuing debt denominated in local currency, a phenomenon known in the literature as “original sin”.<sup>3</sup> These difficulties, for instance, often resulted in a trade-off when they financed long-term projects. Agents borrowed at long maturities in foreign currency, which led them to incur a currency mismatch if their revenues were denominated in local currency or if they financed themselves with short-term loans.<sup>4</sup>

From a general perspective, currency and maturity mismatches matter because they have the potential to exacerbate the impact of exogenous shocks, increase the severity of crises, and slow the post-crisis adjustment process (Goldstein and Turner (2004)). They also complicate monetary policy as they limit the degree of exchange rate movements that central banks are willing to permit (ie the “fear of floating” hypothesis), thus forcing them to intervene to prevent such movements. Furthermore, fiscal deficits may become a major drag for the economy if currency depreciations increase the cost of foreign denominated debt. Finally, they can affect the level of sovereign ratings.

Given the implications that currency and maturity mismatches have for the overall financial stability of the economy, it is reasonable to ask to what extent the development of domestic bond markets has led to a reduction of the vulnerabilities associated with currency and maturity mismatches in the region. Using available data, this section reviews some of the issues and risks relating to such mismatches in Latin America.

## **2.1 The evidence on currency and maturity mismatches<sup>5</sup>**

### **2.1.1 Currency mismatches**

There are at least three dimensions to the measurement of currency mismatches: aggregate, sectoral and microeconomic.

#### *(a) Aggregate currency mismatch*

The notion of currency mismatch refers to the impact of a change in the exchange rate on the present discounted value of future income and expenditure flows (see Goldstein and Turner (2004)). Such a notion has two direct implications. The first is that all assets and liabilities must enter the calculation – not just cross-border assets and liabilities. The denomination of contracts between residents in foreign currencies matters because a sharp change in the exchange rate can disrupt such contracts, which can have real economic effects. Foreign currency debts between residents may “cancel out” in normal times but do not do so in a crisis. The second implication is that the currency denomination of income flows is as important as the currency denomination of balance sheet variables: foreign currency borrowing to finance the production of tradables is one thing, to finance non-tradables quite another.

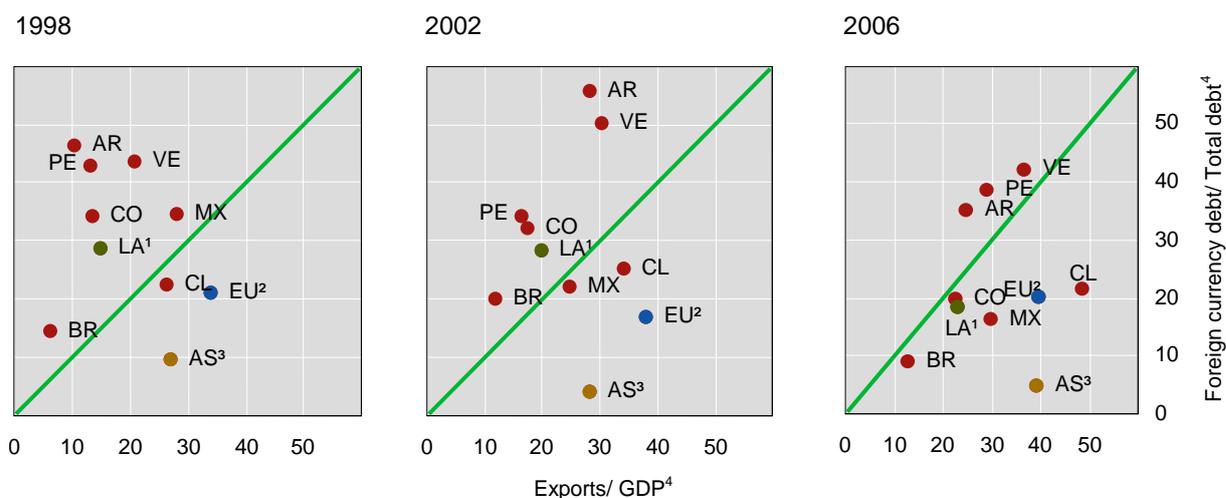
---

<sup>3</sup> For an overview of “original sin”, see Eichengreen and Hausmann (2005) and Goldstein and Turner (2004).

<sup>4</sup> Due to the lack of appropriately developed bond markets, certain market segments, long-term credit in particular, simply will not exist in local currency. Of course, an alternative is to use inflation indexation for the development of such markets.

<sup>5</sup> It is worth noting that most simple stand-alone measures of balance sheet mismatches do not provide an accurate assessment of the associated risks (IMF (2005)). The reasons are that, first, such indicators might not take into account the interaction between interest rate and exchange rate risk. Second, none of the measures give an indication as to which balance sheet mismatches contribute to the deterioration or improvement of the financial health of the corporate sector. Finally, the use of pre-crisis levels for the relevant indicators as “critical levels” may not always be appropriate.

Figure 1  
Currency mismatches



<sup>1</sup> Latin America; weighted average of Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela based on 2000 GDP and PPP exchange rates. <sup>2</sup> Emerging Europe; weighted average of Czech Republic, Hungary, Russia and Turkey based on 2000 GDP and PPP exchange rates. <sup>3</sup> Emerging Asia; weighted average of China, India, Indonesia, Korea, Malaysia, Philippines and Thailand based on 2000 GDP and PPP exchange rates. <sup>4</sup> In per cent.

Source: BIS calculations.

A key indicator of currency mismatch is the ratio between the currency denomination of debt and the share of traded goods in GDP. Simply stated, countries with high export/GDP ratios can sustain a higher share of foreign currency in total debt. If this ratio is greater than one – more foreign currency debt than foreign currency earnings to finance – then the country is experiencing a mismatch. How large a problem this is depends on a country's net foreign currency position; a large net liability position compounds the difficulty. Figure 1 plots the basic components behind the measure of currency mismatch just described. In 1997, the mismatch ratio was well over one in all the largest countries in the region except Chile. This is clearly captured by the average position for Latin American countries, which stands over the 45° line in Figure 1. By 2006, most countries in the region had clearly moved away from such a vulnerable situation, as reflected by their positions below the 45° line. In fact, Brazil, Chile, Colombia and Mexico (the countries with the most developed local currency bond markets) are now, according to this indicator, in a balanced currency position. At the same time, net liability positions in foreign currency have fallen as foreign exchange reserves have been built up, thus lowering aggregate mismatches.

#### (b) Sectoral currency mismatches

Assessing the extent of currency mismatches at the sectoral level is important because it may reveal vulnerabilities that are submerged within the country aggregates.<sup>6</sup> Data for the government sector are generally good.<sup>7</sup> These show that governments in the region have made much progress in reducing their exposure to external debt. For instance, the Mexican

<sup>6</sup> See Rosenberg et al (2005) and Goldstein and Turner (2004) for an analysis of currency mismatches at the sectoral level. In particular, the second study incorporates an estimate of foreign currency denomination of all debt. At the country level, Lima et al (2006) carry out a detailed analysis of sectoral balance sheet mismatches and vulnerabilities for the Colombian economy. Rosenberg et al (2005) also have applications for Argentina and Brazil.

<sup>7</sup> The IMF has assembled a new database for government debt. See Jeanne and Guscina (forthcoming).

government has made an explicit effort to reduce the country's external debt exposure by shifting the financing of its deficits to the domestic market. In fact, since 2001 the entire fiscal deficit has been financed domestically. The Mexican government has also conducted a number of buyback operations in the international market and repaid debt to the Inter-American Development Bank (IDB) and World Bank. As a result, the domestic component of its narrow public sector debt rose to 65% in 2004 compared with 30% at the end of 1995 (Jeanneau and Pérez Verdia (2005)). In Brazil, the government has endeavoured to phase out dollar-linked debt (see Amante et al (2007)).

Table 1  
**Currency denomination of bank balance sheets**  
Percentage denominated in foreign currency

	Assets			Liabilities			Dollarisation ratio <sup>1</sup>		
	1993	2000	2005	1993	2000	2005	1997–2001	2005	2006
Argentina		69.8	20.6		69.1	17.6	63.2	11.8	12.7
Chile	19.7	14.4	18.9	20.6	12.9	17.8	8.2	12.6	NA
Colombia <sup>2</sup>	13.0	8.1	6.5	11.1	10.0	5.4	0	0	0
Mexico	26.7	16.1	9.8	28.2	15.6	9.8	6.9	3.4	3.6
Peru		74.0	66.0		76.0 <sup>3</sup>	66.0 <sup>3</sup>	75.5	64.3	59.6
Venezuela	12.2	8.1	5.7	3.5	2.2	1.2	0.14	0.2	0.2

<sup>1</sup> As a percentage of total deposits in the domestic banking system. <sup>2</sup> With restricted exemptions, legislation prohibits foreign currency deposits. <sup>3</sup> Excludes capital.

Sources: National data (questionnaire); Moody's; IMF; BIS statistics.

Moreover, across the region such efforts are reflected by explicit actions: Argentina repaid its debt to the IMF, Brazil and Venezuela bought back their Brady bonds, Colombia bought back several external issues and Peru reduced its debt with the Paris Club and has issued domestic debt to replace external debt. As a result, the share of international debt in total government liabilities has declined across the region.

Data on the currency denomination of banking system assets and liabilities are also generally readily available – at least for the supervisory authorities. Table 1 presents the currency denomination of bank balance sheets as well as the ratio of dollarisation (ie the ratio of foreign deposits as a percentage of total deposits) in the domestic banking system. In general, the data show a significant improvement. In particular, it is noteworthy that dollarisation in Peru has declined, although it remains high.<sup>8</sup>

Data on the balance sheet structure of the non-financial corporate sector are sketchier. However, some authors have attempted to use partial indicators. One piece of evidence on corporate asset and liability dollarisation during the last decade is presented in Figure 2. As shown, liability dollarisation remains high in most Latin American countries, while asset dollarisation is low.<sup>9</sup> This asymmetry between asset and liability dollarisation indicates that

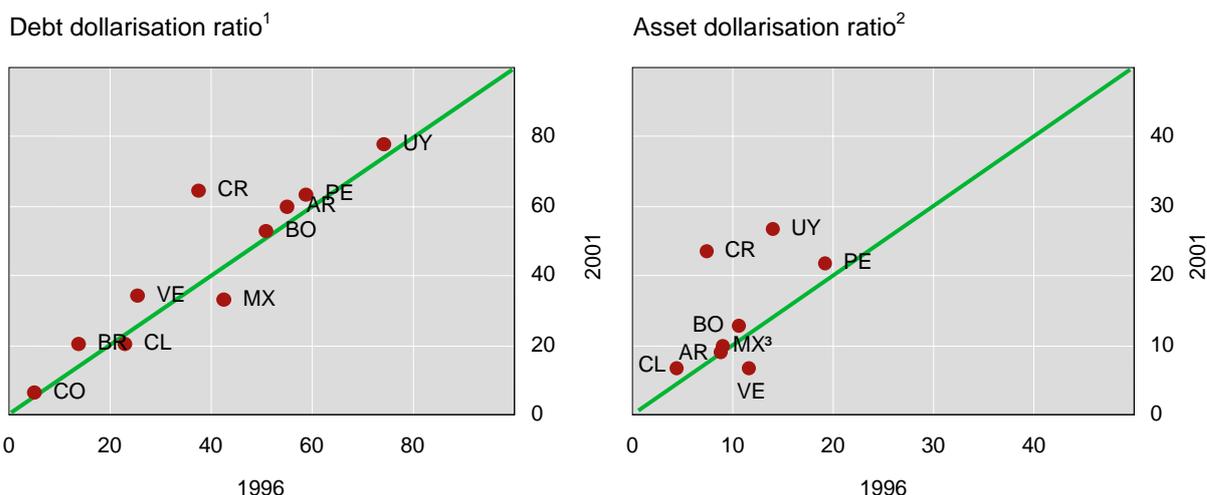
<sup>8</sup> In Brazil and Colombia foreign currency deposits are forbidden by law.

<sup>9</sup> However, this indicator is incomplete because it ignores the currency of denomination of income flows.

currency mismatches in the corporate sector may still be a source of vulnerability. The figures also reveal that debt dollarisation has experienced a very modest improvement over the period. Lima et al (2006) further support this finding. Their study finds that the Colombian corporate sector's net financial position did not change much between 1998 (just before a severe crisis in that country) and 2003. They show that although vulnerabilities have receded, large and medium-size companies still have short positions in dollars.

Figure 2

### Corporate balance sheet dollarisation



<sup>1</sup> Dollar-linked debt as a percentage of total liabilities.

<sup>2</sup> Dollar-linked assets as a percentage of total assets.

<sup>3</sup> Data for 2000.

Source: Kamil (2004).

#### (c) *Micro currency mismatches*

It is also essential to look at the situation of individual firms. Are firms able to hedge their “natural” mismatches? Foreign borrowing can naturally be hedged by an exporting firm but not by a firm producing non-tradables. Several studies have tried different ways to answer this question. Table 2 (drawing on IMF (2005)) shows further evidence on currency mismatches at the corporate level. The information is disaggregated into two groups of firms. One is the group of firms that have issued foreign currency-denominated debt in international capital markets, ie what the study calls “participants”. The other group has not issued foreign currency debt and is therefore simply termed “non-participants”. The information reveals the following features.

First, the ratio of foreign currency debt to total debt is higher in Latin America than in other regions of the globe. However, the reliance on short-term debt appears to be lower, both for market participants and for non-participants. Second, the ratio for foreign currency and short-term debt is far from homogeneous across the region. In particular, the corporate sectors of Argentina, Chile and Colombia appear to rely heavily on foreign currency debt. Third, non-participants are more dependent on short-term financing than market participants. This mainly reflects the fact that firms that do not borrow from international capital markets are more likely to rely on bank loans and local currency bonds of shorter maturities.

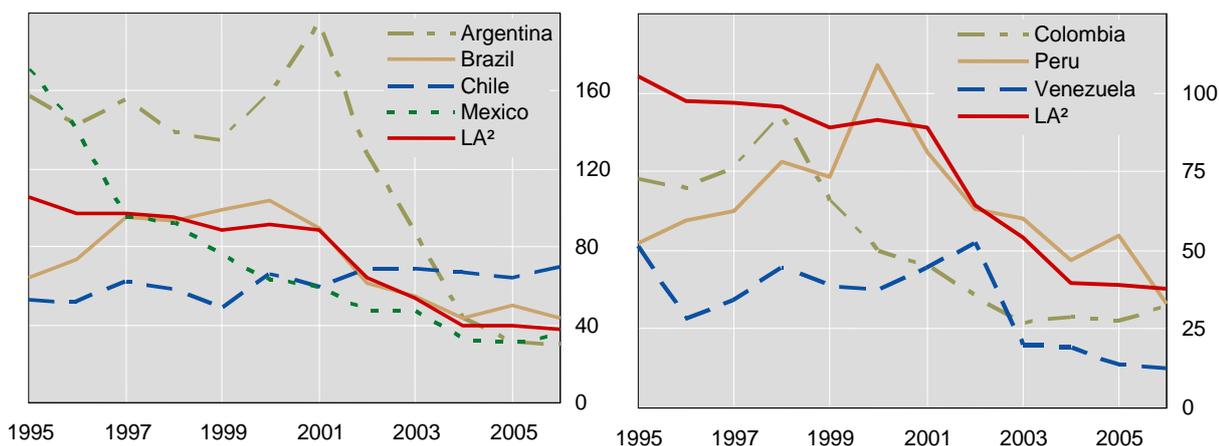
Several other studies attempt to relate reliance on foreign currency debt to the activities of the firm. For instance, Bleakey and Cowan (2005) examined 400 non-financial firms in five Latin American countries and found that firms producing tradables had a higher share of foreign currency debt – a natural hedge. Using a large sample of firms listed on the Mexican stock exchange, Martinez and Werner (2002a) report that firm size was the main determinant of dollar debt during the fixed rate period but that exports became the key explanatory

variable during the floating rate period, as the composition of foreign currency debt shifted toward borrowers better able to service that debt. This finding is echoed by Cowan et al (2005). They find that the net currency exposure of Chilean firms declined after the exchange rate was floated in 1999. They argue that a “flexible exchange rate increases the risk of dollar debt, inclining the balance in favour of peso debt”.

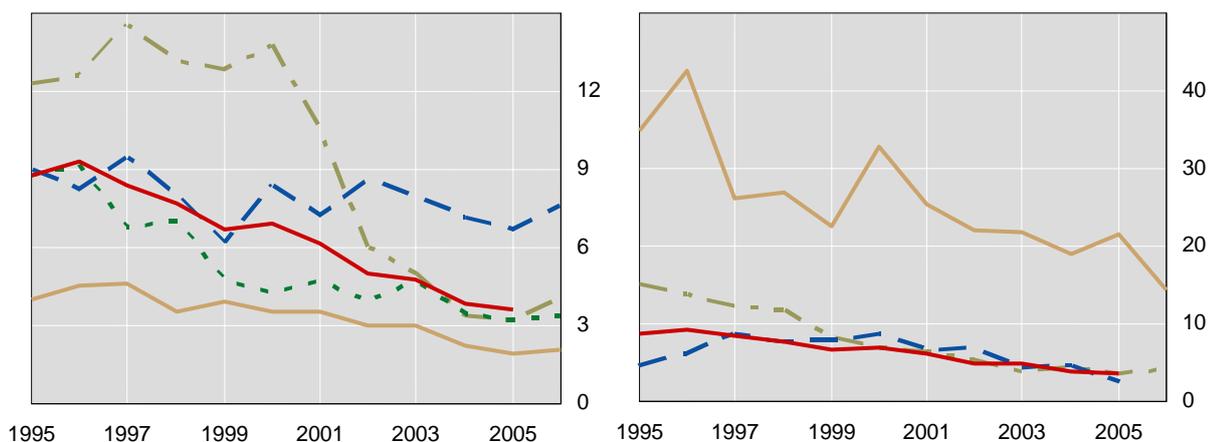
Figure 3

**Short-term external debt<sup>1</sup>**

As a percentage of FX reserves



As a percentage of total debt



<sup>1</sup> Short-term liabilities (with maturity of less than one year) of BIS reporting banks. <sup>2</sup> Weighted average of Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela based on 2000 GDP and PPP exchange rates.

Sources: IMF; BIS.

**2.1.2 Maturity mismatches**

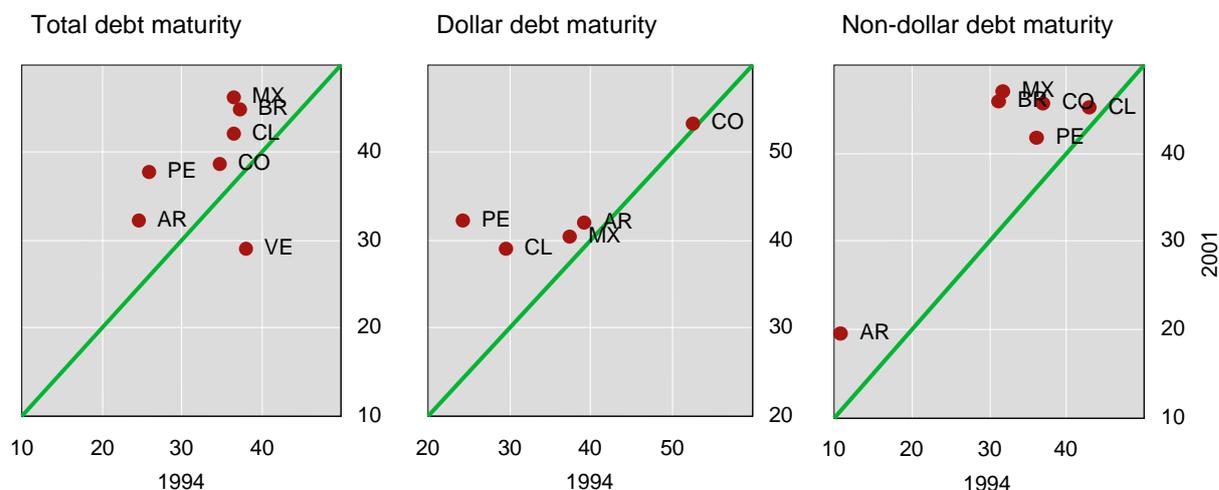
Another important source of vulnerability is that associated with maturity mismatches and rollover risks. One of the difficulties in assessing such vulnerability is that there is not much information on the maturity structure of domestic debt. The only information on maturity structure that is readily available relates to external debt.

At the aggregate level, a crude way of assessing this is through the use of short-term external debt, in particular the ratio of short-term external debt to international reserves and the level of short term external debt to total debt. As is well known, such ratios are considered good predictors of financial crises. Figure 3 displays the evolution of these ratios since 1995. The ratio of short-term debt to international reserves shows a marked

improvement over the period, notwithstanding a deterioration in some cases between 1995 and early 2000s. Also, in most cases it is possible to see a consistent decline in the share of short-term debt as a percentage of total external debt. However, the ratio remains high for Peru.

Maturity mismatches also need to be assessed at the sectoral level. As is discussed in the accompanying article in this volume, “Latin America’s local currency bond markets: an overview”, governments in the region have made substantial efforts to reduce the extent of maturity mismatches by issuing debt at longer maturities. As an illustration, the Brazilian government’s debt management policy has explicitly aimed to reduce refinancing risk by reducing the share of federal debt maturing within 12 months (Amante et al (2007)).

Figure 4  
Corporate debt maturity composition<sup>1</sup>



<sup>1</sup> Calculated as the ratio between long-term liabilities (assets) and total liabilities (assets), in per cent.

Source: Kamil (2004).

Figure 4 gives an overview of maturity mismatches within the corporate sector between 1994 and 2002 as reported by Kamil (2004).<sup>10</sup> Each panel in the figure displays the share of long-term liabilities to total liabilities, the share of long-term dollar-denominated liabilities to total dollar liabilities and the share of long-term non-dollar liabilities to total non-dollar liabilities, respectively. The evidence suggests that there has been some progress in improving the maturity structure of corporate debt, independently of its currency composition.<sup>11</sup> As the first panel shows, only Venezuela appears to have seen a worsening in the maturity of its corporate debt.

<sup>10</sup> Unfortunately, the data are outdated. In particular, 2002 is not the best year to make an assessment given the impact of the financial turmoil in Brazil.

<sup>11</sup> Using 2002 as an end year may bias the diagnostic. Using more recent data would probably show an improvement in the corporate sector’s maturity composition. However, more recent data at this level of disaggregation are unavailable. Martinez and Werner (2002b) report that in Mexico the number of firms issuing three-year or longer maturity debt with fixed rate in pesos or UDIs increased from eight firms before 1999 to 23 in 2002. It was not until 2000 (after 20 years) that a Mexican company was able to issue fixed-rate peso debt longer than three years.

Table 2  
Corporate debt structures, 1990–2003<sup>1, 2</sup>

	Short-term debt as % of total debt		FX debt as % of total debt	Current ratio <sup>3</sup>		Quick ratio <sup>4</sup>	
	Market participant	Non-participant	Market participant	Market participant	Non-participant	Market participant	Non-participant
Argentina	43.1	60.7	51.4	0.8	1.6	0.6	1.1
Brazil	23.5	47.9	11.1	1.2	1.3	1.0	1.0
Chile	21.8	32.8	34.9	1.4	2.5	1.0	1.9
Colombia <sup>2</sup>	31.3	43.6	53.9	1.9	1.6	1.4	1.0
Mexico	27.4	35.1	16.5	1.4	2.2	1.0	1.5
<i>Memo:</i>							
<i>Latin America</i>	29.4	44.0	33.6	1.3	1.9	1.0	1.3
<i>Asia</i>	39.1	51.3	23.0	1.2	1.5	0.8	1.1
<i>Emerging Europe</i>	38.5	59.9	20.4	1.3	2.1	0.9	1.4
<i>All emerging markets</i>	35.7	51.7	25.7	1.3	1.8	0.9	1.3

<sup>1</sup> Individual country ratios are value weighted (by firm's total assets). Regional ratios are equal-weighted averages of country ratios. <sup>2</sup> "Participants" refers to firms that have issued foreign currency denominated debt in international capital markets. For Colombia the size of market participants is less than 10. <sup>3</sup> Ratio of current assets to current liabilities. <sup>4</sup> This is a more conservative measure of liquidity that differs from the current ratio only in that the numerator is reduced by the value of inventories.

Source: IMF (2005).

Table 2 presents additional evidence to gauge corporate liquidity: current and quick ratios. Low liquidity ratios suggest that a company may not be able to convert its current assets into cash in order to meet maturing obligations. This inability may force the company to roll over its debt to avoid insolvency, which could be problematic if lenders sense that the firm is facing difficulties and withdraw their support. The evidence reported indicates that the ratios for Latin America tend to be higher than in other regions of the world. Evidence also shows that "market participants" have lower ratios and, as a result, appear to be more exposed to maturity mismatches. Overall, the evidence suggests that currency and maturity mismatches have been reduced over the last decade. However, this process has been driven largely by the public sector. Little progress seems to have been made by the corporate sector.

### 3. Risk structure of local debt markets

The wider availability of financial structures and their different risk profiles is making the intermediation process more complex. This situation can potentially lead to new risks, both for financial market participants and the financial system as a whole. This section analyses the financial stability implications associated with the structure of local debt markets. In particular, it reviews the risks associated with the issuance and holding of different debt instruments and the manner in which agents operating in the market, either issuing entities or investors, can affect financial stability.

### **3.1 Risk characteristics of financial instruments**

The differentiating characteristics of domestic debt instruments include the type of borrower and the borrower's default risk, the type of contractual return and the length of time to maturity. Finer distinctions can be drawn with respect to call and put provisions, tax status and clearing arrangements. An additional consideration is market liquidity, which depends as much on the inherent characteristics of issues as on the stock of securities outstanding. This sub-section reviews the characteristics of the most common securities.

#### **3.1.1 Dollar-linked debt**

Several countries in the region first attempted to develop their local bond markets by issuing dollar-indexed debt. This often appeared to be the only cost-effective or practical means of rolling over domestic debt given the high level of domestic short-term interest rates. However, the heavy reliance on such debt led in some cases to severe difficulties, as illustrated by the Mexican tequila crisis of late 1994 and the Brazilian crisis of 2001.

In Mexico the problem arose when, in 1994, investors became increasingly reluctant to roll over their short-term peso-denominated *cetes* and instead shifted their funds to short-term dollar-indexed *tesobonos* (Agénor and Montiel (1999)). This shift to dollar-indexed liabilities provided a temporary respite for the government but the short-term nature of outstanding securities also meant that the transformation in the structure of debt towards *tesobonos* was extremely rapid. The sudden withdrawal of foreign investment from the domestic market at the end of 1994 and the ensuing sharp drop in the Mexican peso resulted in an explosive growth in the peso value of dollar-indexed government liabilities, thereby adding a fiscal dimension to the external crisis.

A similar phenomenon occurred in Brazil, where local currency debt issuance became prohibitively expensive after the sharp depreciation of the real between the end of 2000 and September 2001. Concerns by investors that the currency could weaken further increased the demand for currency hedges, which led the government to resume large-scale sales of dollar-linked notes after earlier efforts had been made to reduce such indexed securities. Believing that the exchange rate was significantly undervalued, the authorities also saw the issuance of dollar-linked notes as a means of reducing the domestic cost of debt financing since any increase in the dollar value of the real would have led to valuation gains. In retrospect, with the recovery in the real, dollar-linked financing turned out to be cheaper than financing in reals, thus allowing the authorities to economise on financing. However, there would have been significant costs had the government's expectations proven wrong (Goldstein and Turner (2004)).

#### **3.1.2 Short-term interest and Inflation-linked debt**

The risks of dollar-linked borrowing have encouraged governments in the region to shift to securities indexed to domestic economic variables, such as short-term interest rates or inflation. Short-term or longer-term debt indexed to short-term rates protects investors' capital in the event that interest rates rise, but also leaves public accounts exposed to significant volatility in interest rate payments. This was the case in Colombia in 1998 and 2002. During the second half of 1998, the cost of government financing skyrocketed. The auction rate for government papers (*Títulos de Tesorería*, or *TES*) reached 35%, compared with 23.6% at the beginning of the year. A similar problem was experienced during 2002, leading to what was called the "mini" *TES* crisis. During this period the government was unable to tap the market for several months due to the high cost of financing.<sup>12</sup> Attempts to

---

<sup>12</sup> In fact, at the time, the government had to suspend several auctions due to the high cost of financing.

counter downward pressures on exchange rates have had a similar effect, which has been particularly true under fixed exchange rate regimes, with interest rates often having to respond sharply to maintain the currency peg.

Governments in the region have also sought greater recourse to inflation-linked debt.<sup>13</sup> Inflation-linked securities are widely available across the region, with Chile having a long-standing market for such securities (Herrera and Valdes (2004)). Such instruments have been viewed as a means of developing local financial markets, particularly in countries that have lacked fiscal and monetary credibility.<sup>14</sup> For governments, an advantage of such securities is that they allow for a sharing of the inflation risk with investors. However, the indexation of securities to inflation can have a negative impact on public accounts in the event of an upsurge in inflation (although less so than indexation to short-term rates, which tend to be more volatile). Under such a scenario, higher real adjustments in expenditure and revenue will be required in the longer-term (Holand and Mulder (2005)). Moreover, by providing a hedge against inflation, such securities can weaken economic agents' incentives to achieve price stability.<sup>15</sup> They can also create operational difficulties in the conduct of monetary policy. Despite their drawbacks, these securities are attractive to domestic investors requiring long-term inflation-protected securities, such as pension funds. For this reason, they are likely to remain in use for the structuring of well diversified portfolios.

### **3.1.3 Fixed rate debt**

The progress made in controlling inflation has allowed governments in the region to gradually develop their markets for fixed-rate debt. The growing issuance of fixed-rate securities has reduced domestic refinancing risks, at least as far as the yield curve extends, and has helped in reducing currency mismatches. It has also provided countries with insurance against negative supply shocks that are combined with a rise in inflation (Holand and Mulder (2005)).<sup>16</sup> However, fixed rate debt is not free of problems. The obvious drawback is that the issuer foregoes the ability to benefit rapidly from lower market rates should they eventually decline. This is less of a problem nowadays because debt managers have a variety of means at their disposal to reverse their exposures, such as call options and interest rate swaps. One potential danger for the financial system is that the availability of longer-duration liabilities leaves market participants exposed to greater price risk in the event of a sharp change in interest rates.

---

<sup>13</sup> Foreign currency denominated debt may be more cost effective than inflation-indexed debt under some circumstances. However, in general, inflation-indexed debt would have more favourable risk characteristics given that countries have better control of their inflation rates than their real exchange rates (Holand and Mulder (2005)).

<sup>14</sup> For instance, Mexico introduced Udibonos in 1996 as a way of extending the maturity of its debt, lowering its funding costs and diversifying its public financing instruments (Holand and Mulder (2005)). Walker (2002) shows that these instruments have fostered the development of deeper capital markets in Chile. He argues that the successful acceptance of these instruments is because the unidades de fomento (inflation indexing units) are produced by an independent entity, are legally accepted as a valid alternative currency and enjoy a tax treatment that is consistent with indexation in the economy. More recently, Argentina actively issued inflation-linked bonds.

<sup>15</sup> Although it could also be argued that for fiscal reasons indexation could increase the authorities' determination to ensure a climate of low inflation.

<sup>16</sup> These are shocks that force a joint decline in output and government revenues. It should be noted that fixed rate debt would be superior to inflation-indexed debt in such a case since the government could inflate away the real cost of debt servicing.

### **3.1.4 Corporate debt**

As noted in the accompanying chapter in this volume on the development of local currency bond markets, corporate debt markets have expanded in recent years. The market risks associated with the holding of corporate debt are identical to those for risk-free securities, but credit risk is an additional concern. Credit risk, which is reflected in a spread over risk-free securities, can be highly volatile, particularly when unexpected corporate events occur. The development of corporate debt markets requires adequate infrastructure to deal with asymmetric information problems and other capital market imperfections. The lack of appropriate corporate governance, transparency and economy-wide credit assessment capabilities may hide balance sheet weaknesses, potentially leaving investors exposed to corporate distress with systemic implications.

### **3.1.5 Asset-backed securities**

In addition to these more “traditional instruments”, the region is now starting to rely on new structures, such as asset-backed securities (ABSs).<sup>17</sup> The creation of such securities involves the packaging of a pool of illiquid assets into marketable securities that are more liquid and safer from a stability point of view. A key requirement for the development of securitisation is that, in the event of a default by the original lenders, the securitised assets are protected from the creditors of the defaulting parties. This scenario of course requires appropriate legal frameworks.

The development of ABSs has helped improve the efficiency and completeness of financial markets in some of the largest industrial countries, and is now rapidly expanding in Latin America. The diversified nature of underlying portfolios and the use of a variety of techniques to mitigate credit risk, such as over-collateralisation and third-party credit enhancements, have resulted in the creation of a new class of highly rated securities. Asset-backed securities can be particularly useful to banks, providing them with greater flexibility in the management of their balance sheets and capital resources. In particular, by allowing creditors to take assets off the balance sheet, they free up lending lines and enable banks to have access to lower funding. Therefore, structured financing may help reduce risk exposure and add value and liquidity to the loan book.

However, such securities create important challenges. For instance, the limited availability of good historical data for household finance products may lead to greater uncertainty about the credit risk that investors are really holding. In fact, the capacity of forecasting agents to pay may be particularly difficult in a rapidly evolving macroeconomic environment, which is often characteristic of the Latin American economies.

Another important concern is the reliance on domestic credit rating agencies in the structured finance markets. In the early stages of the development of these markets, the structuring of new issues is relatively easy, as they involve homogeneous assets such as residential mortgages for which default probabilities are easily calculated via the law of large numbers. As markets develop, less homogeneous assets are securitised. These are more sophisticated in terms of legal structure and in the type of assets used, which implies that rating agencies become more closely involved in structuring and issuing, and they therefore may create potential conflicts of interest that are different from those in the traditional business. In particular, rather than just giving opinions about companies and sovereigns, the ratings of structured finance products are to a large extent based on methodologies and, to a lesser extent, on expectations regarding legal aspects and government behaviour during

---

<sup>17</sup> See Scatigna and Tovar (2007) for an overview of securitisation in Latin America and Gyntelberg et al (2007) for a comparative analysis of securitisation in Asia and Latin America.

periods of financial distress. Equally important, reliance on rating agencies may delay the development of better accounting standards and disclosure rules.

In addition, prepayment risk on fixed rate mortgages may be a new concern. In some countries, mortgage borrowers can prepay their mortgages at any time. In an environment of declining mortgage rates, this can become a problem for holders of those securities because the resulting acceleration in prepayments forces the issuers to call their securities. As investors face a shortening in the duration of their portfolios, they attempt to return to their target duration by replacing the called securities with newly issued mortgages, standard fixed income securities or long positions in government bond futures. In turn, these actions create upward pressures on the price of fixed income securities and, consequently, further downward pressures on interest rates. Such a destabilising spiral of events can lead to increased market volatility, as occurred in the United States in the early 2000s and in Chile during 2004.

### **3.1.6 Derivatives**

Derivatives markets are increasingly active in some of the larger countries in the region, such as in Brazil and Mexico. Derivatives are leveraged instruments and, as such, are a highly cost-effective means of adjusting risk exposures (see Euro-currency Standing Committee (1994)). They allow the unbundling of various kinds of price risks embodied in underlying assets, facilitate the transfer of risk to those more capable of bearing and managing them and permit the establishment of investment and arbitrage strategies that straddle various market segments. In the light of these considerations, they are likely to improve market efficiency. Under normal conditions, they seem likely to have a stabilising influence on underlying markets. During periods of stress, however, they may exacerbate short-run price volatility, which can result from the feedback effects of dynamic hedging, margin and collateral calls or a drying up of market liquidity. Regulators in some countries in the region have been concerned about the potential risks involved in the use of such instruments and their ability to supervise their usage, which may have retarded their development. Of course, the lack of hedging instruments or their development offshore can by itself be a source of risk.

### **3.1.7 Other indexed instruments**

Lastly, some countries have issued bonds in the international market place with returns that vary directly with some index of economic performance, such as economic growth or export revenues. Such securities give foreign investors an opportunity to share in the economy's potential growth, while enabling the issuing country to ensure itself against a potential slowdown or debt servicing difficulties. A caveat with such structures is that their prices are likely to be more closely correlated with those of equity markets than with standard fixed income securities, and thus offer investors fewer diversification benefits. Some have also argued that the issuance of such securities would amount to taxing economic growth since any improvement in activity would have to be shared with foreign investors.

## **3.2 Risk associated with the type of issuer**

An important question to address is the extent to which an issuing entity may affect financial stability. Governments in the region are the largest issuers of domestic debt. There are some advantages to a strong presence of governments in domestic debt markets. For instance, governments tend to play a key role in the development of liquid debt markets through the creation of risk-free yield curves, which are used as benchmarks for private sector issuance. However, excessive reliance on government issues in the domestic market has several disadvantages, which may have implications for financial stability. To what extent is this concentration of issuance a risk?

A well known problem with government issuance is the impact that it has on local interest rates and credit risk. Heavy government issuance can create upward pressure on the domestic yield curve, which forces the corporate sector to pay higher market rates for its financing, with possible negative implications for the financial situation of heavily indebted firms. Another implication is that strong government borrowing can crowd out the private sector and impede its development. It can also drive corporates to borrow abroad and therefore magnify any existing currency mismatches.<sup>18</sup>

A high degree of exposure of the financial system to government securities can also create problems. A good example of this is the exposure of the Colombian financial system to government securities (ie TESs). Vargas (2006) warns of the trade-off that such exposure creates between inflation, interest rate and foreign exchange risk. More precisely, a dilemma arises when there is a shock to the capital account that forces a depreciation of the currency and a decline of value of government securities. If the depreciation is sufficiently pronounced or if the pass-through is large, the central bank may be forced to increase interest rates to maintain its inflation target. This, in turn, would lead to a decline in the price of government securities. However, if the banking system's capital is too low to absorb those losses, the central bank may be constrained in raising interest rates due to financial stability considerations, and hence the risk of higher inflation may arise. Stress tests for Colombia show that a 100 bp parallel increase in the TES spot curve could result in a 17% profit decline by credit institutions in 2004, and a 2.5% fall in the value of their portfolios as of May 2005. This is a non-negligible effect given that the 2002 turmoil pushed sovereign spreads up by 400 bp.

In some economies, such as Mexico and Brazil, corporates have slowly become major issuers in local markets. This development has benefits as it allows investors to diversify their investments away from government securities. However, some concerns arise as the market develops. One is the high concentration of issuance among a few large groups of companies. An example of this is Mexico, where the corporate bond market is dominated by a small number of issuers, some of which happen to be interrelated.<sup>19</sup> Concentration may thus result in an effective lack of diversification for investors purchasing such securities. Another problem is the lack of secondary market liquidity of such corporate securities. In particular, investors may find themselves locked in with these securities in bear markets.

Finally, a concern for stability may arise if foreign subsidiaries issue in domestic markets without the guarantee of the parent company. In 2006 in Colombia, for example, a US\$200 million fixed rate bond denominated in local currency by Comcel, a subsidiary of the Mexican América Móvil, was the first one launched without its parent organisation's guarantee.

### **3.3 Risk associated with the type of investor**

In addition to commercial banks, institutional investors, such as pension funds, insurance companies and mutual funds, have become key players in the bond markets of the region. Moreover, the presence of foreign investors has increased.

A broad investor base is fundamental for the development of bond markets as it allows for diversification of risks and deeper markets. On the other hand, a narrow investor base can

---

<sup>18</sup> Of course, the government could avoid the crowding-out effects by issuing external debt in foreign currency. However, doing so can generate a trade-off between the short-run benefits and the long-run cost associated with an increased fiscal drag (Turner (2003)).

<sup>19</sup> América Móvil, Cemex, Coca-Cola, Telmex, Bimbo, Ford, Grupo Carso and IMSA have a share of approximately half of the outstanding corporate bond market in Mexico. América Móvil, Telmex, and Grupo Carso all belong to Carlos Slim.

be a concern. Chilean private pension funds are often used as an example of this problem. Pension funds have been the main driver in the development of Chilean capital markets since their inception in 1981. They are considered to have contributed to financial stability during periods of stress, such as when other investors pulled out of the country in the late 1990s (Cifuentes et al (2002)). However, an important drawback is that pension funds have become a virtual monopsony. Given that they are also subject to rules limiting their investments in non-investment grade paper, they could potentially undermine stability as they magnify the impact of ratings downgrades. In particular, a process of adverse selection would arise if institutional investors were obliged to sell downgraded bonds and poorer credits were forced onto banks (Turner (2003)).

Some types of investors may be an important source of liquidity risk. Good examples are hedge funds and mutual funds. As is well known, hedge funds have been directly or indirectly associated with nearly every major episode of financial market turmoil during the late 1990s (IMF (1998)).<sup>20</sup> The systemic risk impact of hedge funds is difficult to assess owing to the lack of publicly available information about their balance sheet and trading activities. Furthermore, any further systemic risk assessment is complicated by the diversity and the multitude of factors that may affect individual and collective hedge fund behaviour under different market conditions. Under normal market conditions, hedge funds seem to play a positive role, particularly since they bring liquidity to markets. However, they may also contribute to a build-up of invisible vulnerabilities in the financial system (Papademos (2007)). Moreover, hedge funds are highly leveraged and pose two key risks for financial stability (Tsatsaronis (2000)). The first one arises when a hedge fund amasses sufficient long positions as to influence specific asset prices or tactically exploit its influence on other participants' behaviour to tilt the market in its favour. A second risk is associated with large and concentrated positions during liquidity or solvency crises. In this case, the functioning of the market in which the hedge fund was active is disrupted. The institutions that helped finance these positions may also experience serious losses. Depending on the nature of exposures and prevailing market conditions, these dynamics can have systemic implications. As a result, the possible simultaneous exit of hedge funds could have an adverse impact on market liquidity and volatility.

Whether domestic investors are a more stable source of financing than foreign investors is another aspect of concern. Owing to an assumed information disadvantage and their "footloose" nature, foreign investors have long been considered to have a destabilising influence on emerging markets. In contrast, Turner (2003) argues that foreign investors play a key role in spreading risk in local currency bond markets (in the same way that foreign debt did in the past).

In addition, foreign investors have recently been a source of long-term financing, clearly illustrated by the 20-year global sovereign Brazilian real-denominated bonds. Those securities were issued at a fixed rate with a maturity that exceeds the maximum for similar domestic bonds (which is 10 years). Also, about 70% percent of 20-year government bonds issued by Mexico in 2005 were held by foreigners.

The experience of Colombia also illustrates the important role of foreign investors. As mentioned earlier, the financial sector there is exposed to growing uncovered long positions

---

<sup>20</sup> Hedge funds are not easy to define. However, they are characterised by: (i) having none of the traditional restrictions on retail investments in terms of diversification and marketability of financial assets; (ii) making heavy use of derivative products or financial techniques that enable them to short-sell; (iii) making extensive use of leveraging; (iv) having substantial outperformance commissions (which increases the incentives for risk-taking) and; (v) having fund shares that are often not redeemable at any time by investors, although there are granted windows of opportunity to sell back their shares (see Prada (2007)). Nevertheless, 18 of the 20 largest financial markets for asset markets supervise the management or distribution of hedge funds.

in TESs resulting from the reduced foreign exchange exposure of the public sector. The risk associated with this exposure could be lessened by transferring some to non-residents (Vargas (2006)). Furthermore, the exposure to foreign exchange risk in the public sector could also be transferred to non-residents either by allowing foreign investors to access the market or, if regulatory frameworks are too rigid, as in the case of Colombia and (less so) Brazil, by issuing global bonds in local currency (Tovar (2005)).

In general, one can also argue that a narrow reliance on local investors limits liquidity. Recent episodes tend to confirm that local investors can bring about destabilising behaviour in certain cases. A good example of this occurred in Mexico in the spring of 2004, when the tightening of monetary conditions prompted Mexican funds to shift to shorter-duration assets. This shift would have made longer-term issuance much more difficult had it not been for increased holdings of longer-term bonds by foreign investors (see Jeanneau and Pérez Verdia (2005)).

The previous examples illustrate the advantages of expanding the investor base beyond domestic investors. Such a diversification has occurred in Latin America, particularly in countries where restrictions on foreign investment have gradually been removed (as in Brazil, Mexico and Peru).

## **4. Implications for risk management**

The development of bond markets is inducing changes in risk management practices in Latin America, which, in turn, has implications for financial stability. Several issues emerge in this respect. First, effective risk management requires the existence of liquid and transparent financial markets. As such, a relevant question to ask is whether markets in the region meet such prerequisites. A second one is whether risk management tools and practices have evolved at a sufficiently rapid pace to follow developments in underlying financial markets. Finally, it remains an open question whether the existing infrastructure for clearing and settlement is sufficiently robust to ensure an efficient functioning of these markets.

### **4.1 Liquidity**

Market liquidity is essential for the smooth functioning of modern financial systems. The existence of deeper and more liquid bond markets should make it easier for financial institutions to adjust their portfolios of cash market securities and related derivatives in a cost-effective way. The low level of secondary market trading in the region is a concern since active markets are an essential prerequisite for the cost-effective taking or unwinding of positions. Poor liquidity or a liquidity breakdown under stress can induce large changes in market prices and volatility.<sup>21</sup> In extreme situations, it can temporarily convert tradable assets into non-marketable loans, which can lead to substantial losses for market participants who rely on their ability to turn over positions quickly and at favourable prices. Liquid financial markets are also necessary for the functioning of modern risk management systems, which rely on the derivation of accurate benchmark rates for the pricing of portfolios and the smooth functioning of markets for the frequent rebalancing of positions. Until there is genuine progress on that front, financial market participants will find it difficult to hedge their positions at an acceptable price and will therefore be exposed to a fair degree of price risk.

---

<sup>21</sup> In fact, several countries in the region have already shown some vulnerability during periods of stress. Good examples are Brazil in 2001 and 2002 and Colombia in 2002, when financial turmoil led to a drying-up of market liquidity in government paper.

Market liquidity can be related to a number of factors. The size of a bond market and its individual issues is usually seen as a determinant of its depth, liquidity and resilience.<sup>22</sup> In the region, only Brazil and Mexico can be considered to have large enough markets. However, as shown by the bid-offer spreads (see Table 2 in accompanying article in this volume, “Latin America’s local currency bond markets: an overview”), smaller countries should also be able to develop liquid markets. For instance, Colombia has managed to develop a relatively liquid market despite the relatively small size of its government bond market.

What is more, the type of securities traded in a market can have a bearing on market liquidity. In general, indexed securities tend to be held until maturity and are therefore less actively traded and liquid than money market instruments or straight fixed rate bonds. This is illustrated by the wider bid-ask spread for inflation-linked securities. The availability of a wide array of instruments can also prevent the build-up of a sufficiently large stock of homogeneous securities for active trading. In Brazil, for example, there have been various types of inflation-indexed securities (see Amante et al (2007)), while in Mexico fixed rate securities used to be issued by a number of public sector borrowers. A consolidation in the offering of government securities, in terms of either the instruments themselves or their issuing entities, would probably do much to improve liquidity.<sup>23</sup> In particular, a policy of consolidation by the government or the central bank – ie buying back illiquid issues and selling popular ones – could make the yield curve much smoother and thus provide a better benchmark.

Equally important is the breadth of the investor base. The shift to privately funded pension systems in the region has boosted institutional demand for local securities, but the investor base remains narrow. For instance, except in Brazil, the mutual fund industry is underdeveloped, insurance companies tend to be small, and the local hedge fund industry is practically non-existent. In some countries, such as Chile, pension funds have created a virtual monopsony in securities markets.

Furthermore, foreign investors still have a limited presence in most domestic markets owing to the prevalence of capital controls, which remain in place in Argentina, Brazil, Colombia and Venezuela. Trading is also limited by various regulatory restrictions or taxes on interest rate payments, capital gains or transactions.<sup>24</sup> The strong international demand for global issues in local currencies launched by Brazil and Colombia clearly captured the preference of investors for securities that are not affected by such impediments (Tovar (2005)). In Mexico,

---

<sup>22</sup> Borensztein et al (2006) analyse the determinants of local bond markets in a broad cross-section of countries, with a special emphasis on emerging markets. These authors find that country size is significantly correlated with the size of bond markets (scaled by GDP). In their regressions, they also control for non-linear effects of GDP, GDP per capita, the exchange rate regime in place, the level and volatility of interest rates, the amount of domestic credit provided by the banking sector, banking spreads, capital controls, the size of public debt, years since the beginning of privatisation processes, measures of institutions and corporate governance and regional dummies. They find that a limited number of observable policy and country characteristics explain 70% of the difference between bond market capitalisation between Latin America and Asia. The only policy variables that seem to play a significant role for macroeconomic stability (proxied by the volatility of the exchange rate) are openness, investor protection and the cost of enforcing a contract. However, these factors can account for only a quarter of the difference between Latin America and industrial countries.

<sup>23</sup> Turner (2003) also argues that defining issues in a common maturity date (eg 30 June 2008) is preferable than in terms of a common maturity period (eg five-year paper with the maturity defined as five years from the issuance date). Such a strategy allows paper with an identical date of maturity to be issued for prolonged periods, thus simplifying pricing enormously.

<sup>24</sup> In Brazil, foreign investors must register their purchases of securities with the Brazilian securities regulator and the central bank and nominate a legal representative who is required to monitor the fiscal status of their transactions. In addition, they are subject to at least two transaction taxes (an additional 15% withholding tax on capital gains was removed in February 2006). In Colombia, foreign investors can only purchase domestic securities through an investment trust, and a withholding tax varying with the maturity of the securities is levied.

the recent vibrancy of domestic markets has been partly related to the unfettered access by foreign investors to the domestic bond market.

Improvements in liquidity should help the markets become more resilient (ie better able to cope with shocks). However, assessing their resilience is a difficult task. One way to approach this issue is to track the volatility of local currency bond returns. According to Figure 5, there is no broad evidence of regional improvement, although there does appear to be some progress in Chile and Mexico. Moreover, recent episodes offer conflicting evidence. While the May–June 2006 and August–September 2007 adjustment reminds us that these economies are vulnerable to sudden shifts in market sentiment, the February 2007 episode had minor effects. In fact, during this episode trading volumes in Brazil and Mexico reached record highs without major changes in prices. Overall, this evidence needs to be taken with caution as it is difficult to disentangle in some cases whether the secular decline in the volatility of local currency returns is exclusively associated with an improvement in the underlying market liquidity or whether, on the contrary, it was more the result of the favourable global and local conditions.

Overall, improving the liquidity in domestic securities markets remains a major challenge for the region. In this respect, it appears that sensible policy measures should aim at consolidating public sector debt under the same obligor, creating a limited number of benchmarks, allowing short-selling,<sup>25</sup> developing repo markets, removing regulatory restrictions and tax provisions inhibiting active trading, standardising legal frameworks and settlement systems and, finally, broadening the investor base. In this last case, a different option would be to issue global bonds in local currency, to encourage entry of foreign investors or possibly to develop a regional bond fund.

## 4.2 Risk management

The shift to capital market financing means that financial intermediation is increasingly conducted at competitively determined rates, which is exposing intermediaries to greater market risk than in the past. This exposure is magnified by the rising share of securities holdings and derivatives positions in the portfolios of bank and non-bank intermediaries. Moreover, the greater variety of financial products is exposing financial market participants to new types of risks, such as credit risk in the case of corporate securities and refinancing risk in the case of mortgage-backed securities.

The need to deal with such new sources of risk has obliged financial institutions to upgrade their risk management systems.<sup>26</sup> It has also led supervisors to shift from static rules-based approaches to more quantitative and risk-sensitive approaches. Such risk-sensitive methods rely on integrated internal risk management systems for ensuring the safety and soundness of individual financial institutions. In that context, the state of risk management in Latin America appears to be heterogeneous and depends in part on the degree of development of local financial systems. Countries where foreign bank penetration has increased the most, such as Mexico and Chile, appear to have benefited from a transfer of advanced systems. However, even in those countries, weaknesses in the local financial infrastructure and markets may have prevented the wholesale implementation or functioning of those systems.

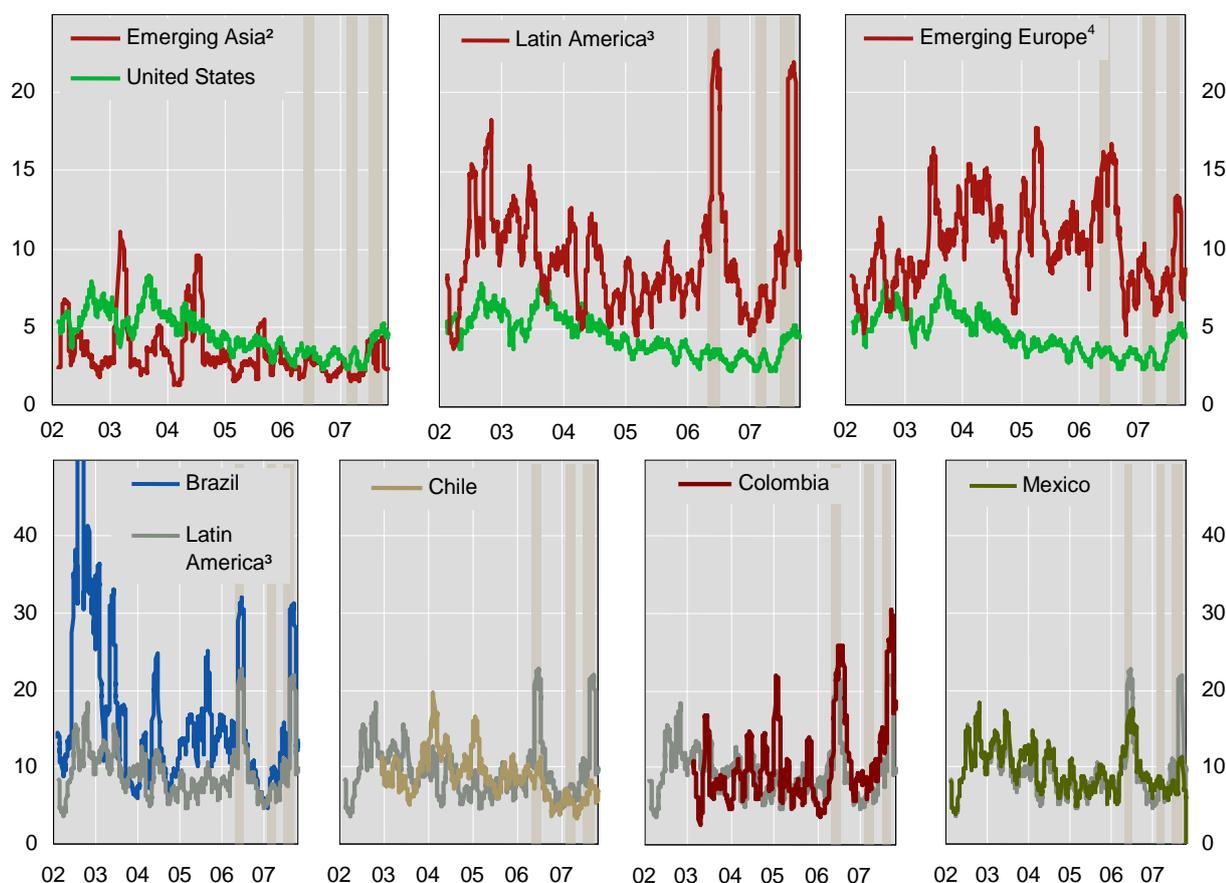
---

<sup>25</sup> The ability to short-sell and borrow a security promotes market liquidity. In this respect an important advantage is that it reduces settlement failures and increases arbitrage opportunities. The favourable impact on liquidity is what led many developed economies to relax its restrictions on securities lending during the 1990s. Nevertheless, it is common in emerging markets to argue that short-selling increases market volatility. See CGFS (2000).

<sup>26</sup> See Moreno (2006) for an overview of risk management practices in emerging markets in the banking sector and financial institutions. See Tovar (2007) for a complementary discussion more focused on Latin America and the Caribbean.

Figure 5

Volatility of local currency bond returns<sup>1</sup>



<sup>1</sup> Calculated as the standard deviation of daily percentage changes in the return index, with a 30-day moving window, annualised. Data refer to unhedged returns in US dollars of JPMorgan's traded index; last dated included 22 October 2007. <sup>2</sup> China, India, Indonesia, Malaysia and Thailand. <sup>3</sup> Brazil, Chile, Colombia, Mexico and Peru. <sup>4</sup> The Czech Republic, Hungary, Poland, Russia, Slovakia and Turkey.

Source: JPMorgan Chase.

Modern risk management systems rely heavily on statistical methodologies, such as value-at-risk (VaR) models.<sup>27</sup> In order to produce reasonably accurate measures of market risk, VaR models require, inter alia, liquid and smoothly functioning financial markets, time series of asset prices and some stability in the correlation of those prices. However, in emerging countries, markets tend to be less liquid than in industrialised countries, historical asset price data are inadequate and markets are at times subject to extreme conditions. Financial institutions have complemented their VaR methodologies with stress tests that enable them to gauge their potential vulnerability to such events. However, there are also a number of caveats associated with the use of such tests. First, they measure exposures to a specified event but not to the probability of such an event. Second, they rely heavily on the experience and judgement of risk managers for their specification, and there is no guarantee that the chosen stress test scenario will be the right one. Third, they impose a high computational burden.

<sup>27</sup> A detailed treatment of VaR is beyond the scope of this paper. In a nutshell, VaR is a statistical estimate of the losses or gains that a portfolio could experience due to changes in the prices of its components over a given confidence interval and holding period.

### 4.3 Pricing

A key issue for policymakers and market participants in Latin America is the extent to which the yield curve reflects all available market information. Although some governments in the region have managed to issue at longer maturities, it is not clear at this stage whether the resulting yield curves are sufficiently stable to generate accurate market rates. Movements in the yield curve may be difficult to interpret because the pricing of longer-term bonds is influenced by various types of risk premia. These include risks associated with a lack of depth in particular segments of the yield curve and high and variable inflation. The threat of large but low-probability adverse events (often referred as the “peso problem”) can also add to the risk premium. Taxes and capital controls are additional distortions.

### 4.4 Clearing and settlement

Another challenge is that the growth in volume and complexity of securities and derivatives has most likely advanced ahead of improvements in the trade processing and settlement infrastructure. This means that although risks can now be more easily diversified and transferred, shortfalls in the infrastructure could lead to adverse dynamics in conditions of stress.

Securities settlement exposes participants to a number of risks. For instance, securities settlements involve a *credit risk* associated with the fact that a counterparty may not settle an obligation for full value (this involves replacement-cost risk and principal risk). Agents may also face *third-party risk*, the possibility that banks or intermediaries required for guaranteeing or providing settlement funds will fail to do so. In addition, settlement operations are also exposed to *liquidity risk*, the risk that the counterparty will fail to settle an obligation on time. *Operational risk* is also frequent in securities settlement due to possible failures in following or performing procedures. Finally, *legal risks* can stem from ambiguous rules governing the clearing and settlement process, which in turn can complicate the management of credit and liquidity risks.<sup>28</sup> The implications for financial stability of not having an appropriate settlement infrastructure can also have a bearing on central banks’ operations given that they operate actively in securities markets.

Two questions arise in such context. What is the current state of the infrastructure for securities clearing and settlement in Latin America? And what are the implications for risk management?

Although it is beyond the scope of this paper to provide a detailed assessment of securities and settlement systems in the region, Cirasino et al (2007) provide an overview of the status (see also Table 3). According to this study, the legal and regulatory frameworks are still lagging behind the improvements already achieved in other areas, particularly in those areas of a technological nature. Furthermore, the study finds that improved clearing and settlement processes in securities and settlements systems are needed in most markets in the region. In particular, it recommends that efforts in this area should aim at achieving same-day trade confirmation, reducing market fragmentation, increasing the standardisation of settlement cycles, operating with shorter settlement cycles, improving market liquidity through automatic securities lending and introducing international communication standards. The report also argues that true delivery-versus-payment (DVP) has not yet been achieved in all the markets of the region. Progress in the infrastructure of securities settlement appears to be a priority.<sup>29</sup>

---

<sup>28</sup> See Guadamillas and Keppler (2001) for a more detailed discussion of the risks associated with securities clearing and settlement systems.

<sup>29</sup> One area that appears to be particularly weak in the region is the infrastructure for cross-border settlements (Argentina, Brazil and Mexico are possibly exceptions).

In particular, the physical handling of securities continues to pose a risk in some countries and reduces the efficiency of these markets. Finally, measures are required to guarantee the protection of customers' assets in the event of bankruptcy of the depository holding its titles or the insolvency of the custodian.

Table 3  
**Clearing and settlement of  
government securities in secondary markets**

	Trading mechanism	Settlement date
Argentina	Stock exchange, <sup>1</sup> OTC	T+3
Brazil	OTC and BM&F <sup>2</sup>	T+1
Chile	Stock exchanges, DVC <sup>3</sup>	T+1
Colombia	DVC <sup>3</sup>	T+0
Mexico	OTC/MexDer (futures)	T to T+4 T+3 to T+4 for foreigners
Peru	Cavali	T+1

<sup>1</sup> MAE, Euroclear, Cedel.      <sup>2</sup> Brazil's Future and Mercantile Exchange.      <sup>3</sup> Centralised securities depositories.

Source: JPMorgan.

Despite some of these weaknesses, important progress has been made, in particular in the largest countries. For instance, of particular relevance is the infrastructure for the settlement of local securities. As a result of the progress, a number of risks will become less of a concern over time. For instance, *principal risk* (the risk that a seller of a security delivers it but does not receive the cash, or that the buyer of a security pays but does not receive the security) will diminish as DVP systems effectively start to operate. In addition, the risks associated with settlement lags have been reduced.<sup>30, 31</sup>

<sup>30</sup> Although settlement lags provide market participants with additional time to finance the trades, they also increase replacement cost risks (ie the risk that a counterparty may default prior to settlement, denying the non-defaulting party the gain on the transaction) (BIS (1992)). Settlement lags can also amplify over time any disruption in the settlement system. The mechanism operating in this case comes from the fact that participants can measure the direct effects of a possible disruption but cannot measure the impact of such disruption on their counterparties, thus limiting any further trades. See Devriese and Mitchell (2006).

<sup>31</sup> In general, there are a number of management initiatives, procedures and tools that can mitigate the impact of other risks associated with securities clearance and settlement systems (see Guadamillas and Keppler (2001)). For instance, credit risk can be handled with appropriate admission standards and monitoring mechanisms so as to ensure the creditworthiness of clearing agents. Bilateral credit limits can also be established, and clearing organisations can require collateral to cover certain exposures. In addition, loss-sharing procedures can be established, and same-day settlement and liquidity facilities can be set up. Finally, all unsettled securities or failed positions can be mark-to-market to reflect the fluctuations in market prices. Operational risk can also be mitigated with back-up facilities, automated recovery, authentication of procedures and access controls.

## 5. Concluding remarks

Latin American countries have made substantial progress in developing their domestic bond markets, which has important implications for financial stability. The shift away from dollar-denominated debt has reduced a key source of currency mismatch and the move toward longer maturities in domestic markets has helped reduce interest rate and refinancing risks. The evidence seems to suggest that much progress has been made at the government level but less so by the corporate sector.

However, even within the government sector, vulnerabilities remain. Short-term and indexed securities still represent an important share of the total stock of government debt. In some cases, debt levels remain a concern. Market liquidity also represents a constraint in most countries, both in primary and secondary markets, which complicates market participants' risk management operations.

The development of bond markets has created new risks and transformed the nature of others. This has been mainly the result of the introduction of new instruments and market participants, as well as of changes in market structure. This development has also resulted in a need to adjust risk management practices – a task that is not always easy in the region given the incomplete development of financial markets and the low level of market liquidity.

Overall, the development of domestic bond markets may have helped to ensure greater stability of domestic financial intermediation. However, a convincing test of whether this is indeed the case will depend on markets' behaviour under less favourable macroeconomic and financial conditions.

## References

- Agénor, P and P Montiel (1999): *Development macroeconomics*.
- Amante, A, M Araujo and S Jeanneau (2007): "The search for liquidity in the Brazilian domestic government bond market", *BIS Quarterly Review*, June, pp 69–82.
- Bank for International Settlements (BIS) (1992): *Delivery versus payment in securities settlement systems*, Committee on Payment and Settlement Systems, September, Basel.
- (2007): *Financial stability and local currency bond markets*, *CGFS Papers*, no 28.
- Bleakey, H and K Cowan (2005): "Corporate dollar debt and devaluations: much ado about nothing?", mimeo.
- Borensztein, E, B Eichengreen and U Pannizza (2006): "Building bond markets in Latin America", University of California-Berkeley, mimeo.
- Committee on the Global Financial System (CGFS) (2000): *Market liquidity: research findings and selected policy implications*, March, Basel.
- Cifuentes, R, J Desormeaux, and C Gonzalez (2002): "Capital markets in Chile: from financial repression to financial deepening", *BIS Papers*, no 11, June, pp 86–102.
- Cirasino, M, J Garcia, M Guadamillas and F Montes-Negret (2007): *Reforming the Payments and Securities Settlement Systems in Latin America and the Caribbean*, Washington DC: The World Bank.
- Cowan, K, E Hansen and L Herrera (2005): "Currency mismatches, balance sheet effects, and hedging in non-financial corporations", *Central Bank of Chile Working Paper*, no 346, December.
- Devriese, J and J Mitchell (2006): "Liquidity risk in securities settlement", *Journal of Banking and Finance*, vol 30, pp 1807–34.

- Eichengreen, B and Hausmann, R (2005): *Other people's money: debt denomination and financial instability in emerging market economies*, Chicago University Press.
- Euro-currency Standing Committee (1994): *Macroeconomic and monetary policy issues raised by the growth of derivatives markets*, Basel.
- Goldstein, M and P Turner (2004): *Controlling currency mismatches in emerging markets*, Washington DC: Institute for International Economics.
- Guadamillas, M and R Keppler (2001): "Securities clearance and settlement systems: a guide to best practices", *Policy Research Working Paper 2581*, Washington DC, April.
- Gyntelberg, J, E Remolona and C Tovar (2007): "Securitisation in Asia and Latin America compared", in L Rob de Vries and P Ali (eds), *Innovations in securitization, Yearbook 2007*, Kluwer Law International.
- Herrera, O and R Valdes (2004): "Dedollarisation, indexation and nominalization: the Chilean experience", *Central Bank of Chile Working Paper*, no 261, May.
- Holand, A and C Mulder (2005): "Can indexed debt absolve original sin? Going indexed or is self-flagellation needed?", presentation at the IMF-BCRP Conference, "The policy implications of de-facto dollarisation", Lima, Peru, April.
- International Monetary Fund (IMF) (1998): *World Economic Outlook*, Washington DC, May.
- (2005): *Global financial stability report: market developments and issues*, Washington DC, April.
- Jeanne, O and A Guscina (forthcoming): "Government debt in emerging market countries a new data set", IMF WP/06, mimeo.
- Jeanneau, S and C Pérez Verdia (2005): "Reducing financial vulnerability: the development of the domestic government bond market in Mexico", *BIS Quarterly Review*, November, pp 61–71.
- Kamil, H (2004): "A new database on the currency composition and maturity structure of firm's balance sheets in Latin America, 1990–2002", Inter-American Development Bank, mimeo.
- Lima, J, E Montes, C Varela and W Johannes (2006): "Sectoral balance sheet mismatches and macroeconomic vulnerabilities in Colombia, 1996–2003", *IMF Working Paper WP/06/5*, revised 1/23/06, International Monetary Fund, Washington DC.
- Martinez, L and A Werner (2002a): "The exchange rate regime and the currency composition of corporate debt: the Mexican experience", *Journal of Development Economics* 69, pp 315–34.
- (2002b): "Capital markets in Mexico: recent developments and future challenges", paper presented at Banco de México seminar "Estabilidad macroeconómica, mercados financieros y desarrollo económico", 12–13 November.
- Moreno, R (2006): "The changing nature of risks facing banks", *BIS Papers*, no 28.
- Papademos, L (2007): "Monitoring hedge funds. A financial stability perspective", *Financial Stability Review*, no 10, pp 113–23, Banque de France, April.
- Prada, M (2007): "The world of hedge funds: prejudice and reality", *Financial Stability Review*, no 10, pp 127–35, Banque de France, April.
- Rosenberg, C, I Halikias, B House, C Keller and J Nystedt (2005): "Debt-related vulnerabilities and financial crises", *IMF Occasional Paper No 240*, International Monetary Fund, Washington DC.
- Scatigna, M and C Tovar (2007): "Securitisation in Latin America", *BIS Quarterly Review*, pp 71–82, September.

Tovar, C (2005): “International government debt denominated in local currency: recent developments in Latin America”, *BIS Quarterly Review*, pp 109–118, December.

——— (2007): “Banks and the changing nature of risks in Latin America and the Caribbean”, *BIS Papers*, no 33.

Tsatsaronis, K (2000): “Hedge funds”, *BIS Quarterly Review*, pp 61–71, November.

Turner, P (2003): “Bond market development: what are the policy issues?”, in R E Litan, M Pomerleano and V Sundararajan (eds), *The future of domestic capital markets in developing countries*, Washington DC: Brookings Institution Press.

Vargas, H (2006): “Public debt market risk: a constraint on monetary policy? The effects on the financial system and on monetary policy: the case of Colombia”, *BIS Papers*, no 28.

Walker, E (2002): “The Chilean experience in completing the markets with financial indexation”, in F Lefort and K Schmidt-Hebbel (eds), *Indexation, inflation and monetary policy*, Central Bank of Chile. Santiago, Chile.

# Local debt expansion and vulnerability reduction: an assessment for six crisis-prone countries<sup>1</sup>

Paloma Acevedo, Enrique Alberola and Carmen Broto<sup>2</sup>

## 1. Introduction

The ratios of public and external debt to GDP constitute crucial indicators in assessing the financial and fiscal vulnerability of a country. On the one hand, high ratios of public debt jeopardise its sustainability and its solvency position. On the other hand, a high proportion of exchange rate exposure in debt composition may abruptly worsen its sustainability in times of financial stress, characterised by problems of access to external markets or by sharp exchange rate movements.

In some emerging markets, external and domestic debt denominated in foreign currency (both henceforth referred to as foreign exchange, or *forex*, debt) have played an important role in the structure of public sector debt because these markets could not issue debt locally or in local currency. This constraint is a phenomenon sometimes referred to in the literature as “the original sin” (Eichengreen and Hausman (1999)). The decreasing trend of public debt over GDP in recent years has been accompanied simultaneously and more intensely in many countries by a decrease in the corresponding share of forex debt and has coincided with a period of widespread appreciation of exchange rates.<sup>3</sup> These countries have therefore seen this evolution as signalling a breakthrough: their financial prospects are improved because their financial vulnerability is reduced.

Our goal in this paper is to assess quantitatively this vulnerability reduction and its reversibility under financial turbulence. We focus on six countries that provide an adequate sample of emerging regions: Brazil, Colombia, Indonesia, Russian Federation, Turkey and Uruguay.

We selected these countries among those undergoing crises in the last decade primarily because of data availability. In addition, they exemplify the generalisation of the downward trend of public and forex debt. We chose quasi-gross public debt as the type of debt to include in our analysis so that we could obtain a homogeneous sample of data across the countries and detect in the data the effect of the accumulation of reserves – which is also a central consideration.<sup>4</sup>

---

<sup>1</sup> The opinions expressed in this document are solely the authors' and do not represent the views of the Banco de España. We would like to thank Jose Montero, Iikka Korhonen and participants in the “CGFS Workshop on Balance Sheet Effects and Emerging Markets Bond Spreads” at the Bank of England (London), the emerging market workshop at the Austrian Central Bank, the BIS-FRB Atlanta Joint Meeting on “Recent Financing Trends in Latin America: a bumpy road towards stability” at Mexico City and the Banco de España for the helpful comments received. The usual disclaimers apply.

<sup>2</sup> Contact authors: paloma.acevedo@bde.es, alberola@bde.es, carmen.broto@bde.es.

<sup>3</sup> See, for instance, Inter-American Development Bank (IADB) (2007) for a recent general view concerning public debt in emerging countries.

<sup>4</sup> The choice among gross debt, net debt and any alternative type of measure of debt is not trivial. As stated in IADB (2007), although many countries provide measures of net debt, netting strategies differ across countries, so net debt does not constitute a homogeneous measure. Furthermore, gross debt does not capture the effect of international reserves. See Cowan et al (2006) or IMF (2003) for alternative debt definitions that are different from quasi-gross public debt.

Because no homogeneous database exists that perfectly suits the period of time and disaggregation required by this research, in all but two cases we collected data directly from the specific debt data releases of official institutions. For Russia and Indonesia we used International Monetary Fund (IMF) data. We decomposed quasi-gross debt into foreign debt (issued in international debt markets) versus local debt (issued in domestic debt markets). We then made a further distinction between local debt linked to the exchange rate and local debt linked to local currency when that distinction was available. Table 1 shows the sources and respective links used to create the database.

Table 1  
Database construction

Country	Debt crisis year	Availability of data	Description	Source	Web link
Brazil	2002	1999	General government gross debt <sup>1</sup>	Central Bank of Brazil	<a href="http://www.bcb.gov.br">www.bcb.gov.br</a>
			Public sector domestic debt <sup>2</sup>	Ministry of Finance	<a href="http://www.stn.fazenda.gov.br/estatistica/est_divida.asp">www.stn.fazenda.gov.br/estatistica/est_divida.asp</a>
Colombia	2003	2001	Public sector debt <sup>1</sup>	Bank of the Republic	<a href="http://www.banrep.gov.co/economia/deuda/BoletinDePu18.pdf">www.banrep.gov.co/economia/deuda/BoletinDePu18.pdf</a>
			National government domestic debt <sup>2</sup>	Ministry of Finance and Public Credit	<a href="http://www.minhacienda.gov.co">www.minhacienda.gov.co</a>
Indonesia	2001	2001	Central government gross debt	Art. IV (IMF)	
Russia	1999	1998	Central government gross debt	Art. IV (IMF)	
Turkey	2001	1998	Public sector debt <sup>1</sup>	Turkish Treasury	<a href="http://www.treasury.gov.tr">www.treasury.gov.tr</a>
Uruguay	2003	1999	Public sector debt <sup>1</sup>	Central Bank of Uruguay	<a href="http://www.bcu.gub.uy/autoriza/pepmaf/deudapublica/dbspg2.xls">www.bcu.gub.uy/autoriza/pepmaf/deudapublica/dbspg2.xls</a>

<sup>1</sup> Domestic and external debt. <sup>2</sup> Used to calculate the breakdown of domestic public debt.

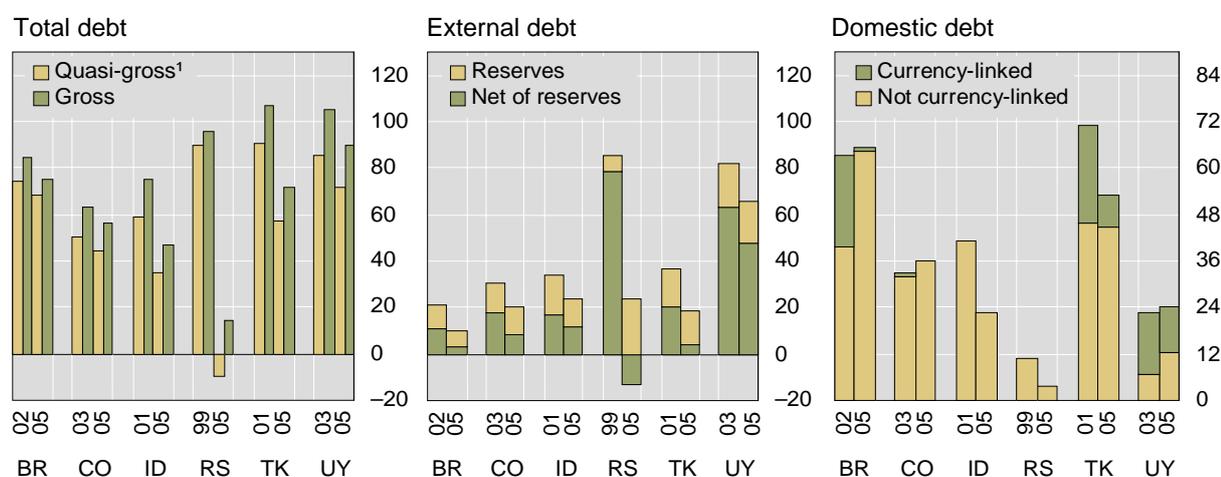
Source: Authors' elaboration.

Figure 1 displays the ratio of public sector debt to GDP for these countries in 2005 and in the year of the highest outstanding debt during the past decade, which in most cases coincides with episodes of financial turmoil (see Manasse and Roubini (2005) or de Bolle et al (2006) for a dating of financial crises). The graph shows both the gross debt holdings and debt net of international reserves (quasi-gross public debt).

Figure 1

### Gross and quasi-gross public sector debt, selected countries

As a percentage of GDP



BR = Brazil; CO = Colombia; ID = Indonesia; RS = Russia; TK = Turkey; UY = Uruguay

<sup>1</sup> Domestic debt plus external debt net of international reserves.

Source: See Table 1 for variable definitions and sources.

As Figure 1 shows, Russia had the most significant debt reduction. Quasi-gross public debt within the sample shrank about 99 percentage points (pp) of GDP between 1999 and 2005 to become negative, due to the country's large reserve accumulation.<sup>5</sup> In Turkey and Indonesia, the reduction was 34 pp and 24 pp of GDP, respectively, from 2001 to 2005.<sup>6</sup> Brazil also exemplifies these dynamics: in 2002 its quasi-gross public sector debt was 74% of GDP, whereas in 2005 it decreased to around 68% of GDP. The quasi-gross public sector debt in Uruguay and Colombia fell around 13% and 6%, respectively, from 2003 to 2005. It is remarkable that the reduction in debt has been accompanied by an overall reduction in the share of forex debt (external debt, domestic debt in foreign currency or debt linked to the exchange rate).

Figure 2 clearly shows the reduction of the proportion of forex debt. This figure represents the evolution of the debt composition in terms of external debt, exchange rate-linked domestic debt and domestic debt in local currency for the same periods. The decline in the forex debt share is more dramatic in Brazil, Turkey and Colombia (40%, 28% and 18%, respectively). Also notable is the reduction in exchange rate-linked domestic debt in the two Latin American countries,<sup>7</sup> to the point that exchange rate-linked domestic debt was suppressed in Brazil by 2006. Only in Indonesia did the proportion of external debt increase in the later years.

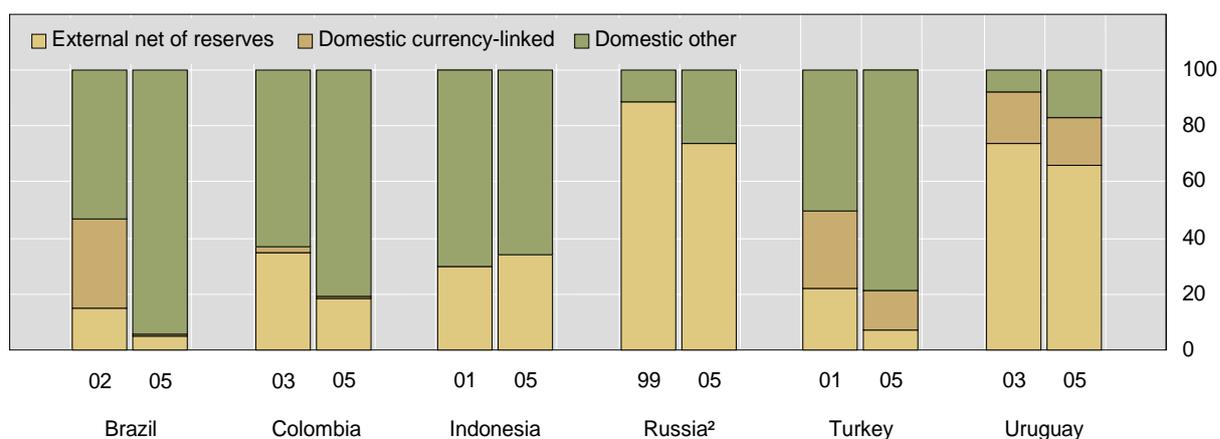
<sup>5</sup> Henceforth, for Russia only, we develop our analysis of public debt in terms of gross public debt rather than quasi-gross public debt. Otherwise, since quasi-gross debt is currently negative, the corresponding results for the rest of the analysis would be misleading.

<sup>6</sup> For Indonesia, the year 2001 is considered to be the previous peak of public debt, mainly because of data availability, although according to other papers (ie de Bolle et al (2006)), the most recent turmoil is traceable back to 1998.

<sup>7</sup> See Jeanneau and Tovar (2006) for a recent discussion of the evolution of domestic markets in Latin America and Tovar (2005) for a detailed analysis of debt denominated in local currency in the three Latin American countries of the sample (Uruguay, Colombia and Brazil).

Figure 2

Quasi-gross public sector debt composition, selected countries<sup>1</sup>



<sup>1</sup> In per cent. <sup>2</sup> Gross public debt used for calculations.

Source: See Table 1 for variable definitions and sources.

There are two categories of explanations for this development of both the public and the forex debt. Figure 3, which shows the evolution of the nominal exchange rate and the sovereign spreads, illustrates the first category: an international context of very favourable financial conditions have influenced public debt considerably. As we shall see, the second category is closely related to the first, i.e. the creation of proactive policies to manage public debt has also been significant.

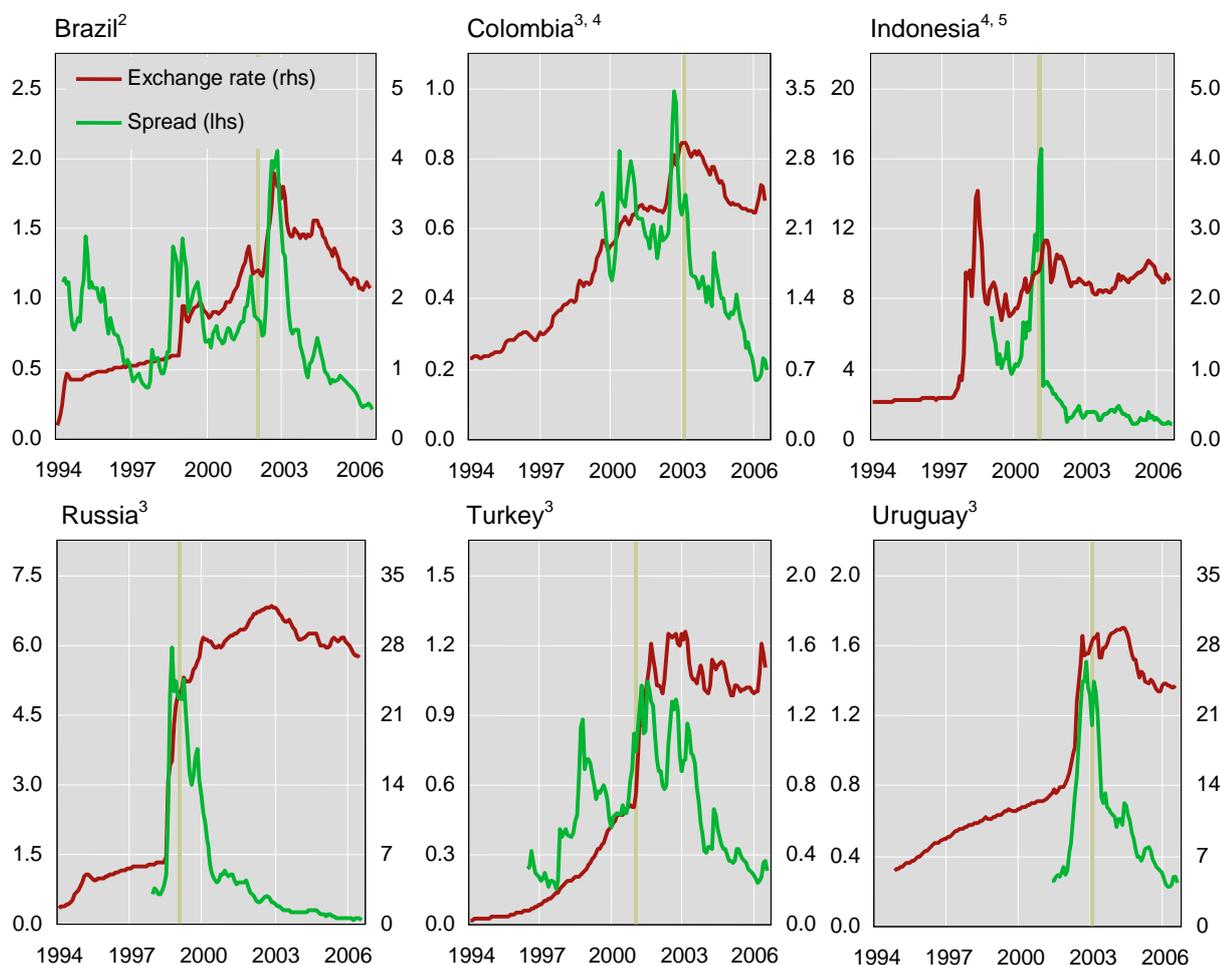
Regarding the favourable international financial context, some aspects are worth qualifying. For instance, just as exchange rate crises make debt explosive in countries with a large share of forex debt, real exchange rate appreciations can dramatically decrease debt ratios and have an impact on the structure of debt. This is precisely what happened after the crises. The exchange rate recoveries were generalised, as shown in the real exchange rate evolutions in Figure 4. The appreciation of the Russian rouble (a 64% real appreciation between 1999 and 2005), the Turkish lira (a 44% real appreciation between 2001 and 2005) and the Brazilian real (26% between 2002 and 2005) were the most significant. The Indonesian rupee is the only currency of the sample that depreciated from 2003 to 2005 (6%) – precisely the only country where the share of forex debt increased. The positive period for emerging financial markets is also confirmed by the dynamics of sovereign spreads that have narrowed in a context of increasing capital flows. In this sense, the EMBI Global Composite decreased around 900 basis points from January 1999 to October 2006, and this reduction of sovereign spreads was especially severe in emerging Europe, where in the same period it narrowed around 2000 basis points.

Another factor contributing to this benign financial framework is the favourable behaviour of the GDP growth rates in all emerging regions in the context of propitious world growth. For instance, the annual percent change of growth in 2005 for such emerging regions as developing Asia, Central and Eastern Europe and Latin America was 9.0%, 5.4% and 4.3% – well above the 2.6% rate of growth for advanced economies in 2005 and higher or similar to world growth (4.9%) (see IMF (2006)).

As for the proactive debt management factor, the evolution of public and forex debt is closely related to the development of local debt markets in local currency. Fiscal authorities began to attach increasing importance to reducing in a sustainable manner the vulnerability of public finances, and began to create more proactive debt policies to manage public debt in this direction. They had learned their lesson from past experience, when excessive exchange rate exposure gave rise to balance sheet mismatches.

Figure 3

**Sovereign spreads and exchange rates  
in crisis episodes, selected countries<sup>1</sup>**



Note: Dates of crisis episodes considered: Brazil (2002); Colombia and Uruguay (2003); Indonesia and Turkey (2001); and Russian Federation (1999).

<sup>1</sup> National currency per US dollar and spreads in thousands of basis points. <sup>2</sup> EMBI + index. <sup>3</sup> MBI Global Index. <sup>4</sup> Exchange rate in thousands of units per US dollar. <sup>5</sup> ABI index.

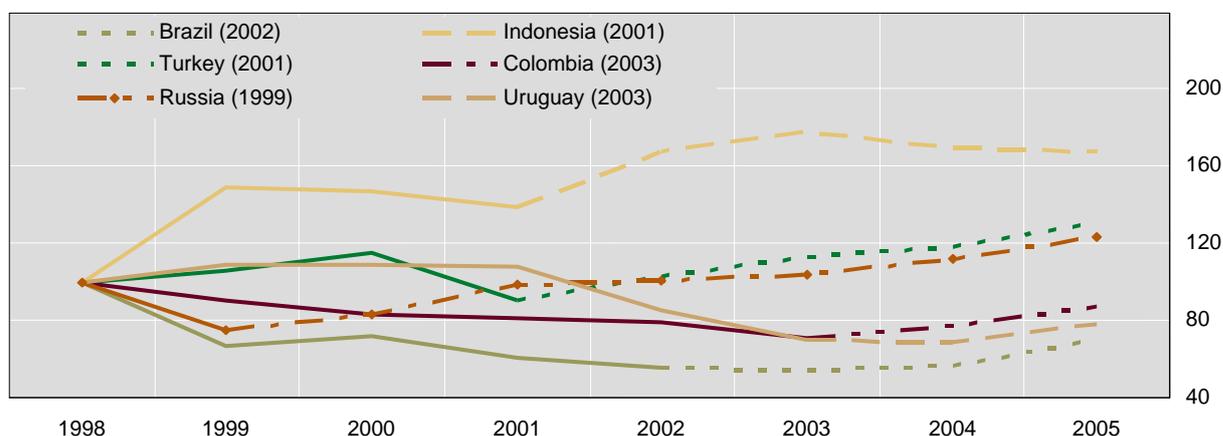
Source: Datastream.

The link between benign conditions and proactive policies derives from another factor. The favourable financial conditions and the expected behaviour of the exchange rate, which increased the relative demand for local debt and the ability of the authorities to place it on the market, also encouraged authorities to make discretionary changes to the debt composition.

Interestingly, the conjunction of these two factors has created a paradox worth mentioning. In an environment of currency appreciation, authorities trying to maximise debt reduction in the short term have an incentive to maintain or increase the share of forex debt, as this would decrease public debt as a percentage of GDP, leading to some sort of “virtuous circle”. Conversely, a reduction of forex debt as a result of active debt management tends to mitigate debt reduction driven by exchange rate appreciation. Contingent on financial turbulence, however, this “paradox of the local debt bias” can be solved. In such a case, the exchange

rate should sharply depreciate and, if there has previously been a reduction in the proportion of forex debt in total debt, then the country is better able to absorb the impact of the negative scenario. The comparison between the short-term costs of debt reduction and the long-term (contingent) benefits is one of the by-products of our analysis.<sup>8</sup>

Figure 4  
Real exchange rates, selected countries<sup>1</sup>



Note: Year of major outstanding debt in brackets; dotted line thereafter.

<sup>1</sup> 1998 = 100.

Source: Economist Intelligence Unit.

For our analysis, we develop a quantitative approach to assess the effective vulnerability reduction in the debt composition and the precise contribution of proactive debt management. First, in the next section, we disentangle the contribution of the exchange rate to the shifts in debt structure from other autonomous or genuine composition effects in the structure of debt. Following that, we develop a theoretical framework of debt dynamics analysis, and then perform a counterfactual exercise based on calculating public debt dynamics under the previous debt structure. In this way we can assess the change in vulnerability based on the difference in percentage points of GDP between the actual debt and the debt resulting from this counterfactual exercise. Then, we replicate the previous crisis scenario of economic and financial turbulence for the period 2006–08 and perform a stress test analysis of debt sustainability. We also use alternative criteria to design the stress as a test of robustness. Finally, we summarise our findings.

## 2. Public debt composition: disentangling price and composition effects

This section focuses on setting a framework for analysis of the effects of the shifts in forex debt (the sum of external and domestic exchange rate-indexed debt) on total public debt. The share of forex debt,  $\alpha_t$  is defined as

<sup>8</sup> In this paper, we focus on the sustainability-vulnerability assessment concerning the exchange rate-linked debt. We do not address other topics on debt composition – such as long-term versus short-term debt or nominal versus indexed debt – even though there is intense debate on these issues. See, for instance, Alfaro and Kanczuk (2006).

$$\alpha_t = \frac{e_t D_t^*}{(D_t + e_t D_t^*)} \quad (1)$$

where  $e_t$  is the nominal exchange rate in the period  $t$ ,  $D_t^*$  is the amount of outstanding forex debt, either external debt or exchange rate-linked domestic debt, denominated in dollars in  $t$ , and  $D_t$  is the outstanding domestic debt denominated in local currency in period  $t$ .<sup>9</sup>

Within this framework, it is rather straightforward to evaluate the importance of the effect of the exchange rate and the effect due to the composition of debt on the total variation in composition. The total variation of the ratios of forex debt to total debt between the final ( $t = 1$ ) and the initial ( $t = 0$ ) periods of reference, that is,  $(\alpha_1 - \alpha_0)$ , can be decomposed in these two effects, as follows:

$$\alpha_1 - \alpha_0 = EE + CE + \varepsilon \quad (2)$$

where the first part of the right-hand side of (2) (EE) is the exchange rate effect and CE is the composition effect. The residual term  $\varepsilon$  in the expression will be allocated between both effects, as we explain below.

EE is the variation in the proportion of external debt. It is indexed to a foreign currency domestic debt resulting from variations in the exchange rate obtained by keeping the amount of debt unaltered. Analytically:

$$EE = \frac{e_1 D_0^*}{D_0 + e_1 D_0^*} - \alpha_0 \quad (3)$$

where the first element in the right-hand side of EE will be denoted as  $\alpha_1^E$ .

CE is the variation of  $\alpha$  due to the changes in the relative volumes of the different types of debt, had the exchange rate not changed:

$$CE = \frac{e_0 D_1^*}{D_1 + e_0 D_1^*} - \alpha_0 \quad (4)$$

where, analogously to (3), the first element in the right-hand side of (4) will be denoted as  $\alpha_1^C$ .

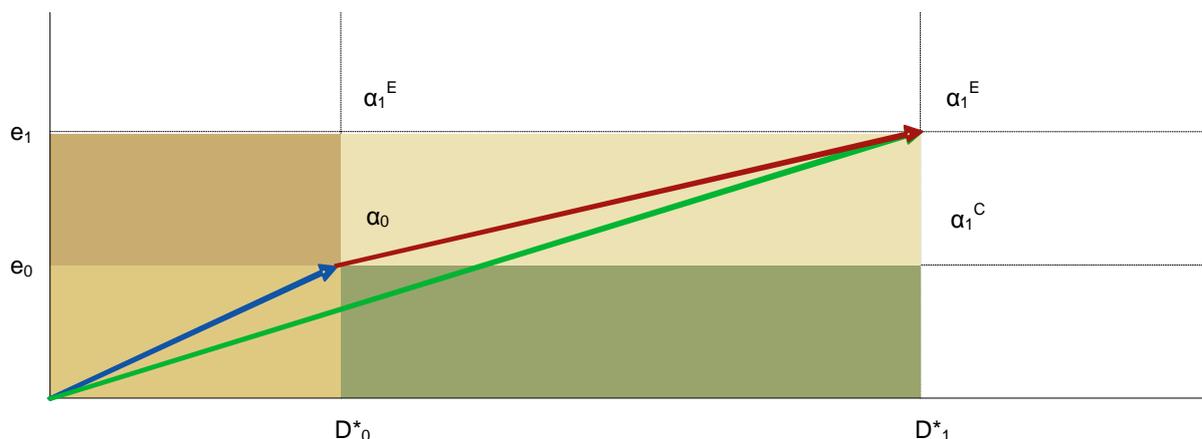
In this last type of effect, the effect of proactive management policies arises, although other factors, such as the relative demand and supply of debt instruments, may also be prominent.

The allocation of the residual change to each factor is made according to the scheme in Figure 5. Notice that the whole variation in the forex debt share (that is,  $\alpha_1 - \alpha_0$ ) is the area defined by coordinates  $e_1 D_1^*$  minus  $e_0 D_0^*$  (the area shadowed with vertical lines). EE as stated in the previous notation would be the area comprising  $\alpha_1^E - \alpha_0$  and CE would be  $\alpha_1^C - \alpha_0$  (the yellow and green shaded areas, respectively). The remaining area should be equally distributed between EE and CE in order to accurately represent the difference between the vectors  $\alpha_1$  and  $\alpha_0$ .

---

<sup>9</sup> See Calvo et al (2002) for a pioneering analysis of fiscal sustainability incorporating the currency composition of debt.

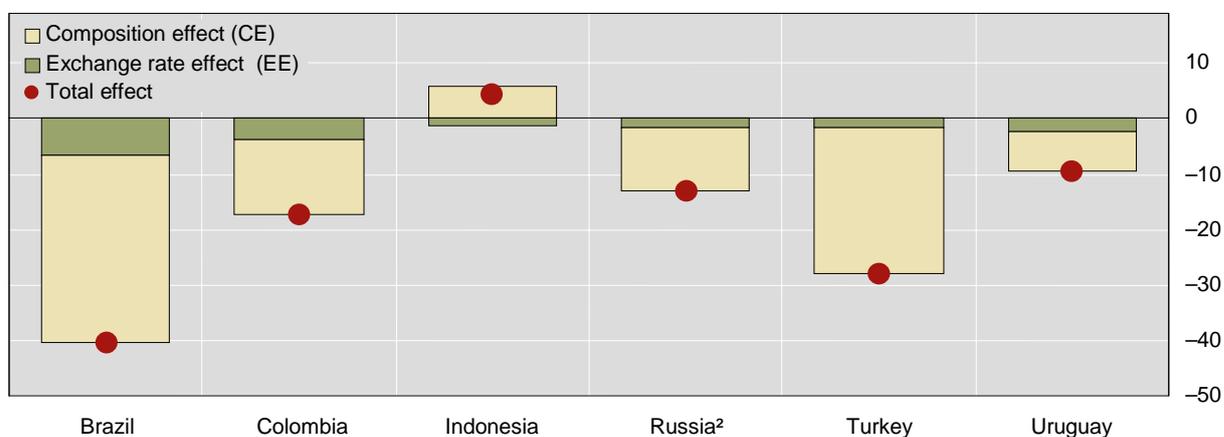
Figure 5  
Public debt decomposition



Source: Authors' elaboration.

The factorial decomposition of EE and CE is represented in Figure 6 for the six countries in terms of the percentage points that each factor has contributed to the reduction in the share of foreign currency debt, considering that  $t = 1$  is 2005 and  $t = 0$  is the year of the corresponding debt crisis for each country. We use as reference for this exercise the public debt net of reserves (quasi-gross public debt), except for Russia, where such magnitude is negative.

Figure 6  
Exchange rate effect and composition effect, selected countries<sup>1</sup>



<sup>1</sup> Variation of the ratios of forex debt to total quasi-gross public debt between the crisis episode and the year 2005, in per cent. <sup>2</sup> Gross public debt used for calculations.

Source: Authors' calculations based on national data.

Despite the strong exchange rate appreciation, CE dominates in all countries but Indonesia, where it contributes to the increase in the share of forex debt. In absolute terms, CE is largest in Brazil: 34% of the 40% reduction in the forex debt share is due to CE. However, in relative terms, it is even more significant in Turkey: 26% of the 28% reduction is CE – in other words, more than 90% of the reduction is due to CE. For the average of the five countries where the share of foreign currency debt is reduced, 85% of the reduction can be attributed to the pure composition effect.

### 3. The framework of analysis: debt dynamics

Public debt sustainability analysis (DSA) is an increasingly widespread tool used to assess the vulnerability position of public finances. In recent years, more attention has been paid to this approach in policy analysis, most notably in IMF country assessments. A growing number of papers also employ DSA – sometimes from a stochastic approach (eg see Celasun et al (2006), Hostland and Karan (2005) or Garcia and Rigobon (2004)). Apart from its simplicity, the main advantage of this methodology for our objectives is that it can provide an explicit measure of vulnerability that can be traced over time and is well-suited to the stress test analysis.

DSA focuses on the debt dynamics equations that are determined, in a simplified framework, by a rather limited number of variables. Furthermore, forecasts for most of these variables are readily available on the market. These forecasts allow us to establish a baseline scenario for the future evolution of debt. The framework is also useful for visualizing how debt would respond to a situation of stress by changing the forecasts using estimates of the variables under negative shocks. These stress tests compound alternative scenarios; this gives an idea of the resilience of debt and therefore of the vulnerability of the public finance position.

The starting point is the debt dynamics equation expressed as:

$$D_t = -PB_t + \frac{(1+r_t)}{(1+g_t)}(1-\alpha_t)D_{t-1} + \frac{(1+r_t^*)(1+\Delta e_t)}{(1+g_t)}\alpha_t D_{t-1}, \quad (5)$$

where  $PB_t$  is the primary balance and  $D_t$  is the stock of public debt at the end of time  $t$ , both expressed as a ratio of GDP. The share of debt denominated in foreign exchange is  $\alpha_t$ , as we already know, while  $(1-\alpha_t)$  is the share of local currency debt;  $r_t^*$  and  $r_t$  are their corresponding real interest rates. Foreign-denominated external debt can be in foreign currency (mostly external debt) or indexed to the exchange rate (mostly domestic debt). Finally,  $\Delta e_t$  is the variation in the nominal exchange rate, where a positive  $\Delta e_t$  means an exchange rate depreciation and  $g_t$  is the real rate of growth.

After some algebra, the dynamics of public debt can be expressed as

$$\Delta D_t = -PB_t + \frac{(r_t - g_t)}{(1+g_t)}(1-\alpha_t)D_{t-1} + \frac{(r_t^* + \Delta e_t + r_t^* \Delta e_t)}{(1+g_t)}\alpha_t D_{t-1}, \quad (6)$$

where, for simplicity, we have dropped the contingent liabilities. This equation is the basis for the sustainability exercises performed in the DSA. Given the current level and composition of debt, for given forecasts of the primary balance, the growth rate, the nominal exchange rate and the real interest rates (domestic and foreign), it is possible to project debt trajectories. Increases in the ratio of debt to GDP derived from these exercises provide a measure of vulnerability, and a decrease in the ratio suggests a reduction in vulnerability.

Expression (6) can be transformed in a more convenient way by separating the effect of the exchange rate from the rest:

$$\Delta D_t = -PB_t + \frac{((1-\alpha_t)r_t + \alpha_t r_t^*)}{(1+g_t)}D_{t-1} - \frac{g_t}{(1+g_t)}(1-\alpha_t)D_{t-1} + \frac{\Delta e_t + r_t^* \Delta e_t}{(1+g_t)}\alpha_t D_{t-1}. \quad (7)$$

For practical purposes, it is important to note that the real interest rates by instrument or currency are not usually available, so that we have to find a way to measure the approximate real cost of local and forex debt. Data exist on interest payments on public debt:  $IP_t$ , which can be defined as

$$IP_t = ((1-\alpha_t)r_t + \alpha_t(1+\Delta e_t)r_t^*)D_{t-1} = \rho_t D_{t-1}, \quad (8)$$

where, for convenience,  $\rho_t$  denotes the average cost of debt at time  $t$ .  $\rho_t$  can be calculated in every country through the data of  $IP_t$  expressed as:

$$\rho_t = \frac{IP_t}{D_{t-1}} \quad (9)$$

For completeness and further convenience, also note that the implicit local debt real rate can be solved from the definition of  $r_t$ :

$$r_t = \frac{\rho_t - \alpha_t(1 + \Delta e_t)r_t^*}{(1 - \alpha_t)}. \quad (10)$$

so that if we are able to proxy for the real foreign cost of debt – through the spread, as it turns out – we derive an approximation of the respective real interest rate by country.

Substituting  $\rho_t$  in (7) yields the basic equation for the empirical approach:

$$\Delta D_t = -PB_t + [\rho_t - (1 - \alpha_t)g_t + \Delta e_t \alpha_t] \frac{D_{t-1}}{(1 + g_t)}. \quad (11)$$

#### 4. Empirics: debt evolution, debt structure and vulnerability reductions

These expressions provide us with an adequate framework to analyse what has been going on in the countries under consideration here. It is convenient to start with an illustrative example of how the different factors impinge on the evolution of debt and then move to a more detailed analysis of the impact of the shifts in debt structure on vulnerability.

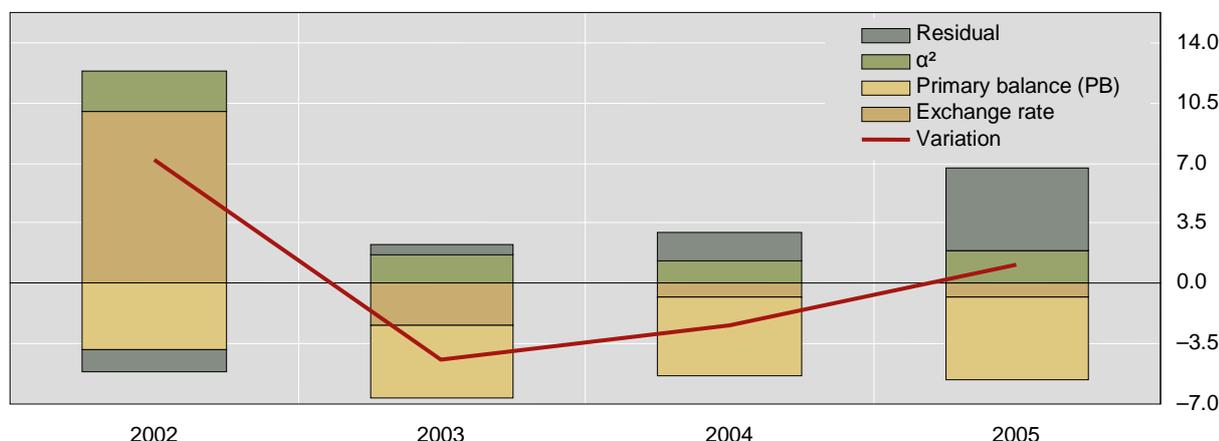
##### 4.1 Contributions to debt reduction

Computing the partial derivatives in expression (5) allows us to determine the contribution of each factor to the variation of  $D_t$  ( $\Delta D_t$ ) on an annual basis. To focus on the issues we are more interested in, we consider the decomposition of the annual variation of  $D_t$  in terms of  $PB_t$  (in this case, there is a one-to-one relationship), and the annual variation of the share of forex debt in total public debt ( $\alpha_t$ ), the exchange rate ( $e_t$ ) and, for the sake of simplicity, the remaining contributions (interest rates and rates of growth) are aggregated in a residual.

Figure 7 illustrates the case of Brazil. The substantial magnitude of the primary balance is a powerful debt reduction driver throughout the period. However, the more interesting results are the interaction between the exchange rate and the share of forex debt  $\alpha_t$ . From 2001 to 2002, the currency depreciated, and there was an important positive contribution to debt of 9 pp of GDP. Thereafter, the appreciation of the exchange rate induced a negative contribution to public debt in GDP. The cumulative decrease in GDP from 2002 to 2005 was 4%. In parallel,  $\alpha_t$  increased in the first, turbulent period. Owing to the contemporaneous exchange rate depreciation, this variable added 3 pp to the debt-to-GDP ratio (the green area in Figure 7). Both factors together ( $\alpha_t$  and exchange rate) amounted to a 12 pp increase in debt in 2002. However, in the following years, the interaction of currency appreciation and reduction in forex debt had a different result: the contribution of the dwindling share of forex debt is positive because it mitigates the effect of the exchange rate appreciation on debt reduction. Finally, the residual picks up the combined contribution of interest rates, growth plus other adjustments.

Figure 7

**Annual variation of public debt in GDP  
by term contributions in Brazil<sup>1</sup>**



<sup>1</sup> As a percentage of GDP. <sup>2</sup> Share of forex debt in total debt, in per cent.

Source: Authors' calculations based on national data.

#### 4.2 A counterfactual exercise: debt reductions without proactive management policies

The Brazilian example highlights the fact that the interaction between exchange rate appreciations and reductions in the forex share can work against debt reduction. This is the “paradox of the local debt bias” that we pointed out in the introduction. But we also noted later that the changes in debt structure (see Figure 6) are in part mechanically driven by the evolution of the exchange rate. In fact, we showed that a substantial part of the reduction in forex debt was not due to the exchange rate evolutions but rather to pure composition effects, in which the proactive debt management policies of the authorities have had a central role.

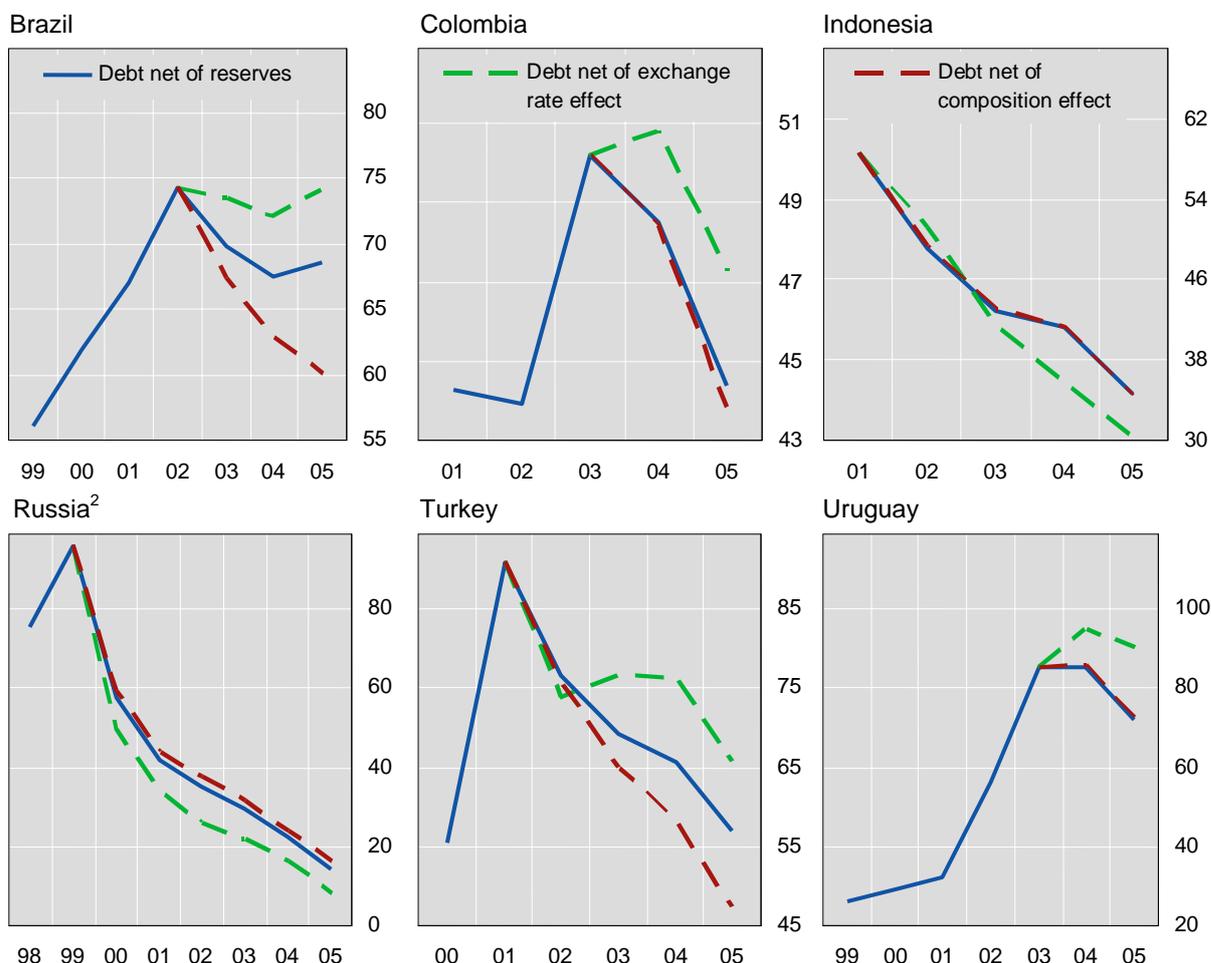
Now, within the debt dynamics framework, we can give a quantitative assessment of the (negative) impact of proactive debt management on debt reduction. The question is straightforward: what would the level of debt be today, netting out the composition effect – that is, looking at it without proactive debt management?

Obtaining the computations of  $\alpha_1^E$  as stated in (3) on a yearly basis, we can determine counterfactual debt paths for the public debt ratio. Figure 8 shows the results of this exercise as carried out for all six countries. The blue line represents the actual public debt trajectory. Netting out the pure composition effect delivers the path represented by the green line. The graph is completed with the opposite exercise, shown by the red line. In this case, we consider the pure composition effect but assume that the impact brought about by the exchange rate evolutions disappears – that is, we assume this to be the current debt level, had the real exchange rate been kept constant.

Table 2 summarises the outcomes of the counterfactual exercise for the six countries. In the case of Brazil, the actual path displays debt falling from 74% to 68% of GDP. However, this decrease is actually much greater, around 60% in 2005, when we net out the pure composition effect. The reason for this difference is that the dwindling forex debt does not fully capitalise the impact of the real exchange rate appreciation. To sum up for Brazil, the implicit loss, in terms of percentage points of debt to GDP, derived from proactive debt management would mean that the level of debt would now be a sizeable 8 pp of GDP. This can be taken as a measure of the opportunity costs of substituting local debt in local currency

for forex debt. On the contrary, if the nominal exchange rate had remained at the 2002 levels, the quasi-gross public debt in 2005 would have been around 79% of GDP.

Figure 8  
**Actual vs counterfactual debt evolution, selected countries<sup>1</sup>**  
 As a percentage of GDP



<sup>1</sup> Public debt net of reserves (quasi-gross debt). <sup>2</sup> Gross public debt used for calculations.

Source: Authors' calculations based on national data.

In Turkey, these proactive policies have also been quite pronounced. There, netting the change in composition due to the government's debt management means that the public debt in 2005 would be 10 pp of GDP less. In the rest of the countries where the reduction in the share of forex debt in total public debt has been relatively small or has not taken place (ie Colombia, Indonesia, Russian Federation and Uruguay), the difference between the actual path of public debt and the public debt under constant composition of the year of crisis is also small (this difference represents less than 1 pp of the GDP of each country).

Brazil and Turkey are clear examples of where the "opportunity costs" of diminishing the share of forex debt in total public debt are more evident, due to both the intense exchange rate appreciations and the efforts by the fiscal authorities to recompose debt in favour of local and local currency-denominated debt.

Table 2  
Counterfactual exercise results for 2005

Counterfactual (2005)	Brazil	Colombia	Indonesia	Russia	Turkey	Uruguay
Public debt net of reserves/GDP	68.5%	44.4%	34.6%	14.5%	57.1%	71.9%
Debt/GDP net of exchange rate effect	74.0%	47.3%	30.4%	54.6%	65.7%	90.3%
Debt/GDP net of composition effect	60.0%	43.8%	34.4%	14.7%	47.3%	72.3%
Points of debt/GDP due to composition effect	5.5	2.9	-4.2	40.1	8.6	18.4
Points of debt/GDP due to exchange rate effect	-8.5	-0.5	-0.2	0.2	-9.7	0.5

Source: Authors' calculations.

Some important caveats, however, give a more nuanced view of the opportunity costs of moving out of forex debt. Most important is that this is a partial exercise. We are assuming that nothing else changes, but this is quite an assumption. As mentioned above, fiscal authorities could not have developed the local debt markets as swiftly under more stringent financial conditions. More importantly, the very same evolution of the exchange rate is not far from the evolution of debt composition; the reduction in external debt, a process deepened by very active policies in Brazil, shapes the expectation of agents and has probably contributed to a greater pressure on the exchange rate and fostered a higher accumulation of reserves (and thus a bigger reduction of quasi-gross debt).

From the second type of exercise, where the exchange rate is kept unaltered, some interesting conclusions also follow. As expected, the numbers show that debt dynamics would have been much less favourable under the exchange rates of the year of crises for the six countries – except for Indonesia and Russia, where the nominal exchange rate has appreciated with respect to their years of crises. The more damaged country in terms of maintaining the same nominal exchange rate would have been Uruguay, which would have increased its debt 18 pp of GDP.

All in all, under the perspective taken in this section, it might seem that proactive policies to reduce the share of forex debt in total GDP have entailed costs in terms of limited debt reduction. Nevertheless, this short-term cost must be balanced with the prospective benefits derived from a less forex-dependent debt structure in cases of financial turbulence.

### 4.3 Stress test: resilience in debt vulnerability

The standard DSA framework based on stress testing consists of designing a situation of turbulence (or stress) comparable to the most recent crises to determine whether vulnerability has effectively been reduced and then contrasting it with a baseline scenario.

The first step, then, is to define the baseline scenario. With forecasts from the IMF's Article IV reports for the countries under study (2003–2006) and *LatinFocus Consensus Forecast* (2006) over a three-year horizon (2006, 2007 and 2008), we obtained the raw data to project the debt paths.

This methodology is useful for improving the homogeneity of the analysis and for comparing the different outcomes with those provided by the IMF. Next, we designed the stress

scenario to replicate the most recent financial turmoil experienced by these countries – coinciding, as we showed above, with the previous peak in debt. Table 3 displays the data underlying the baseline and the stress scenarios. The changes therein are applied to all variables in debt dynamics equation (5).<sup>10</sup>

Table 3  
**Baseline scenario and stress scenario for the simulation of debt dynamics**  
 In per cent

	Baseline scenario				Stress scenario			
	2005	2006	2007	2008	2005	2006	2007	2008
<b>Brazil</b>								
Exchange rate <sup>1</sup>	-12.2	-4.3	3.6	0.0	-12.2	50.3	7.9	18.5
Real GDP growth	2.3	3.5	4.0	3.5	2.3	-0.8	-0.3	3.3
GDP deflator	7.2	4.0	4.2	4.4	7.2	7.5	7.7	7.9
Interest rate (i) <sup>2</sup>	13.5	14.3	12.9	12.4	13.5	14.9	15.5	12.3
Interest rate (i*) <sup>3</sup>	7.5	7.5	7.5	7.5	7.5	11.6	11.6	11.6
Primary balance <sup>4</sup>	4.8	4.3	4.3	4.2	4.8	0.0	3.2	3.5
Implicit liabilities <sup>4, 5</sup>	-0.5	3.0	3.0	0.0	-0.5	3.0	3.0	0.0
<b>Colombia</b>								
Exchange rate <sup>1</sup>	-5.4	6.5	3.4	0.0	-5.4	24.0	-2.6	-13.3
Real GDP growth	5.2	5.2	4.5	4.0	5.2	2.3	-2.4	4.7
GDP deflator	5.5	4.7	4.1	3.5	5.5	5.3	7.4	6.4
Interest rate (i) <sup>2</sup>	8.6	12.2	11.6	10.2	8.6	13.1	12.7	11.2
Interest rate (i*) <sup>3</sup>	6.8	6.8	6.8	6.8	6.8	8.8	8.8	8.8
Primary balance <sup>4</sup>	3.5	3.1	2.4	2.2	3.5	0.9	0.9	-0.3
Implicit liabilities <sup>4, 5</sup>	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Indonesia</b>								
Exchange rate <sup>1</sup>	6.0	0.0	0.0	0.0	6.0	15.6	-3.1	2.2
Real GDP growth	5.6	5.2	6.0	6.5	5.6	4.5	4.9	5.7
GDP deflator	13.7	13.2	6.5	6.5	13.7	16.7	6.0	4.4
Interest rate (i) <sup>2</sup>	6.1	5.7	5.5	5.7	6.1	-3.1	3.4	5.6
Interest rate (i*) <sup>3</sup>	7.4	7.4	7.4	7.4	7.4	25.8	16.6	7.4
Primary balance <sup>4</sup>	2.2	1.2	1.3	1.1	2.2	0.4	0.5	0.3
Implicit liabilities <sup>4, 5</sup>	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0

For footnotes, see the end of the table.

<sup>10</sup> In those isolated cases with no data available for the period of crisis, we obtained the negative shock by adding to the data in the baseline scenario one standard deviation of the available data.

Table 3 (cont)

**Baseline scenario and stress scenario for the simulation of debt dynamics**

In per cent

	Baseline scenario				Stress scenario			
	2005	2006	2007	2008	2005	2006	2007	2008
<b>Russia</b>								
Exchange rate <sup>1</sup>	-1.8	0.0	0.0	0.0	-1.8	153.3	14.4	3.7
Real GDP growth	6.4	6.5	6.5	6.1	6.4	-0.3	11.4	15.0
GDP deflator	19.6	15.6	8.9	6.2	19.6	32.5	27.8	25.1
Interest rate (i) <sup>2</sup>	7.7	10.8	9.2	17.4	7.7	38.8	19.9	22.8
Interest rate (i*) <sup>3</sup>	5.6	5.6	5.6	5.6	5.6	23.5	13.9	7.6
Primary balance <sup>4</sup>	9.2	10.0	8.7	7.8	9.2	-3.6	2.9	7.5
Implicit liabilities <sup>4,5</sup>	-0.5	3.0	3.0	0.0	0.0	0.0	0.0	0.0
<b>Turkey</b>								
Exchange rate <sup>1</sup>	0.7	0.0	0.0	0.0	0.7	116.4	13.1	-14.6
Real GDP growth	7.4	5.0	5.0	5.0	7.4	-7.4	8.0	5.9
GDP deflator	5.4	7.0	5.0	5.0	5.4	26.8	42.2	56.8
Interest rate (i) <sup>2</sup>	24.6	22.9	22.2	22.4	24.6	90.1	112.4	122.9
Interest rate (i*) <sup>3</sup>	6.6	6.6	6.6	6.6	6.6	9.5	9.5	9.5
Primary balance <sup>4</sup>	6.5	6.5	6.5	6.5	6.5	5.5	5.5	5.5
Implicit liabilities <sup>4,5</sup>	-0.5	3.0	3.0	0.0	-0.5	3.0	3.0	0.0
<b>Uruguay</b>								
Exchange rate <sup>1</sup>	-10.2	2.7	2.8	0.0	-10.2	84.2	7.8	-9.9
Real GDP growth	6.6	4.6	4.2	2.8	6.6	-1.1	0.2	1.2
GDP deflator	1.7	5.1	3.8	4.0	1.7	15.0	14.8	3.8
Interest rate (i) <sup>2</sup>	-6.9	6.5	6.3	8.6	-6.9	9.9	9.5	19.8
Interest rate (i*) <sup>3</sup>	7.4	7.4	7.4	7.4	7.4	15.0	15.0	15.0
Primary balance <sup>4</sup>	3.9	3.7	4.0	4.0	3.9	0.1	2.7	3.8
Implicit liabilities <sup>4,5</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

<sup>1</sup> Variation of national currency per US dollar. <sup>2</sup> Nominal domestic interest rate. <sup>3</sup> Nominal external interest rate. <sup>4</sup> As a percentage of GDP. <sup>5</sup> Recognition of implicit or contingent liabilities.

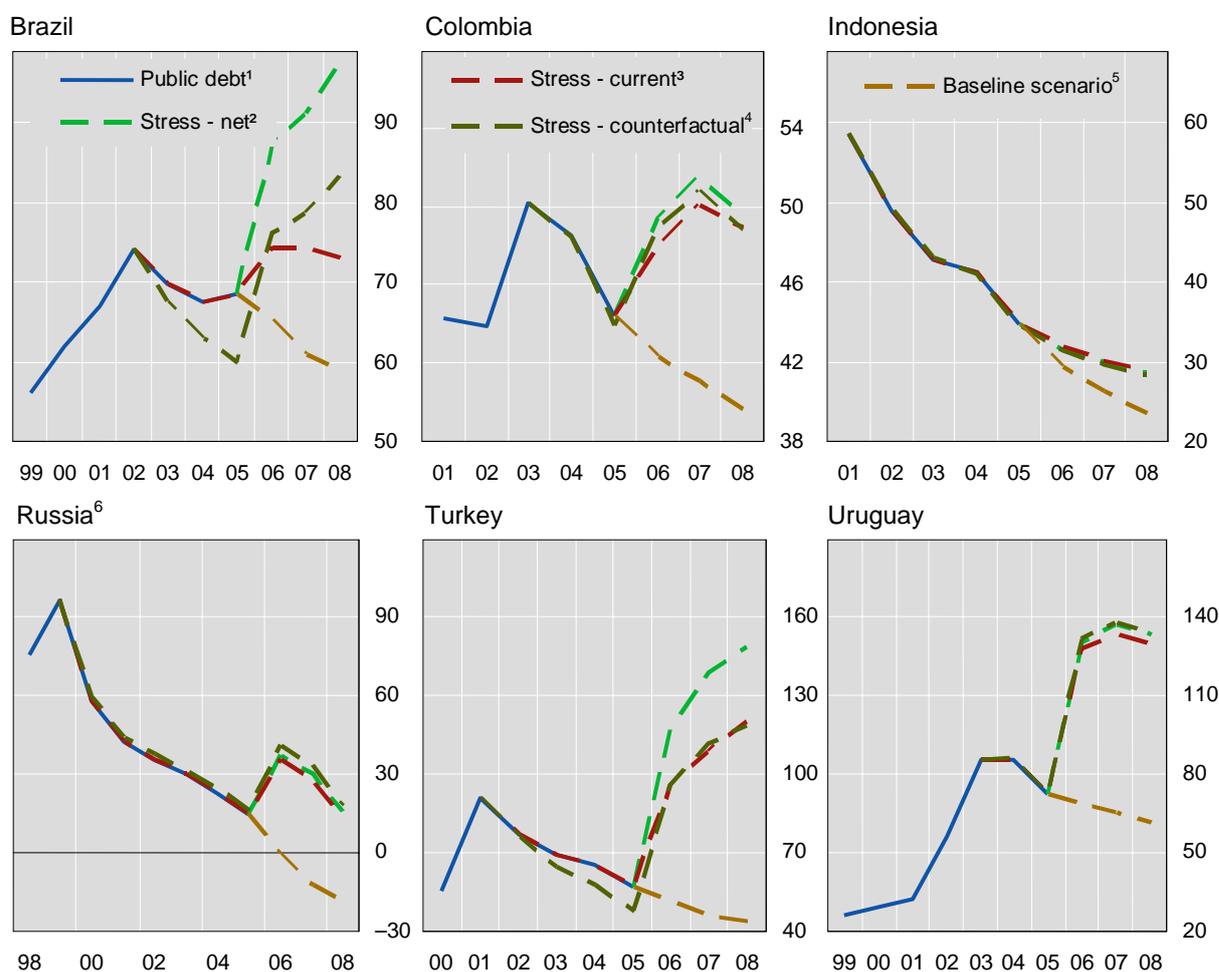
Source: Authors' calculations based on IMF data.

Figure 9 and Table 4 present the results. Looking again at Brazil as illustrative, the blue dotted line represents the baseline scenario and the orange dotted line stands for debt dynamics under the stress scenario. Both debt evolutions employed the path of  $\alpha$  under debt composition for the year 2005. As expected under the baseline scenario – conveying the continuation of favourable conditions – quasi-gross debt gradually decreases towards 60% of GDP, while debt increases under the stress scenario and then stabilises above 70%.

Figure 9

**Baseline and stress scenarios, selected countries**

As a percentage of GDP



<sup>1</sup> Public debt net of reserves (quasi-gross debt). <sup>2</sup> Stress with debt composition net of composition effect.  
<sup>3</sup> Stress with current debt composition. <sup>4</sup> Stress under counterfactual debt composition, defined as the year of major outstanding debt as it appears in Figure 1. <sup>5</sup> Current structure. <sup>6</sup> Gross public debt used for calculations.

Source: Authors' calculations based on national data.

What would the impact of the turmoil have been if the debt structure had been kept unaltered relative to the year of crisis? The red line provides a first, but inadequate, approximation. It represents the impact of the stress test with the debt structure net of the pure CE (but leaving EE operating) and starting from the current level of debt (2005). Notice that the evolution is much more explosive under the current debt structure. Had debt management not been proactive,<sup>11</sup> the increase would have been much larger (to over 95%), as the red line shows, setting the debt on an explosive path. The gap between both lines – more than 20 pp of GDP over a three-year horizon – is indicative of the importance of a less forex-exposed debt structure.

<sup>11</sup> To be more precise, the 2002 debt composition permits the exchange rate to affect the structure but nets out the pure composition effect.

Table 4  
Comparison of stress scenarios

	Brazil				Colombia				Indonesia			
	2005	2006	2007	2008	2005	2006	2007	2008	2005	2006	2007	2008
Baseline scenario <sup>1</sup>	0.69	0.65	0.61	0.59	0.44	0.42	0.41	0.40	0.35	0.29	0.26	0.24
<b>Replica</b>												
Under current structure	0.69	0.74	0.74	0.73	0.44	0.48	0.50	0.49	0.35	0.32	0.30	0.29
Under counterfactual	0.60	0.76	0.79	0.83	0.44	0.49	0.51	0.49	0.34	0.31	0.30	0.28
Gap <sup>2</sup>	-0.09	0.02	0.04	0.10	-0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
<b>Two standard deviations</b>												
Under current structure	0.69	0.73	0.69	0.68	0.44	0.48	0.50	0.53	0.35	0.29	0.23	0.19
Under counterfactual	0.60	0.76	0.74	0.73	0.44	0.50	0.52	0.55	0.34	0.28	0.23	0.19
Gap <sup>2</sup>	-0.09	0.04	0.04	0.05	-0.01	0.01	0.02	0.02	0.00	0.00	0.00	0.00
<b>Aggregated stress</b>												
Under current structure	0.69	0.81	0.84	0.83	0.44	0.55	0.54	0.51	0.35	0.43	0.37	0.29
Under counterfactual	0.60	0.89	0.95	0.93	0.44	0.59	0.59	0.56	0.34	0.41	0.35	0.28
Gap <sup>2</sup>	-0.09	0.08	0.11	0.10	-0.01	0.04	0.05	0.05	0.00	-0.02	-0.02	-0.02

For footnotes, see the end of the table.

Table 4 (cont)  
Comparison of stress scenarios

	Russia				Turkey				Uruguay			
	2005	2006	2007	2008	2005	2006	2007	2008	2005	2006	2007	2008
Baseline scenario <sup>1</sup>	0.15	-0.01	-0.12	-0.20	0.57	0.52	0.46	0.44	0.72	0.68	0.65	0.62
<b>Replica</b>												
Under current structure	0.15	0.35	0.28	0.13	0.57	0.96	1.09	1.20	0.72	1.27	1.33	1.30
Under counterfactual	0.16	0.41	0.33	0.18	0.47	0.95	1.11	1.18	0.72	1.31	1.37	1.34
Gap <sup>2</sup>	0.02	0.06	0.05	0.04	-0.10	0.00	0.03	-0.01	0.00	0.04	0.05	0.04
<b>Two standard deviations</b>												
Under current structure	0.15	0.18	0.09	-0.01	0.57	0.82	1.18	1.77	0.72	0.93	1.01	1.09
Under counterfactual	0.16	0.21	0.11	0.00	0.47	0.69	0.99	1.47	0.72	0.95	1.03	1.11
Gap <sup>2</sup>	0.02	0.03	0.02	0.01	-0.10	-0.13	-0.19	-0.30	0.00	0.02	0.02	0.03
<b>Aggregated stress</b>												
Under current structure	0.15	0.25	0.18	0.06	0.57	0.72	0.69	0.12	0.72	1.18	1.14	0.98
Under counterfactual	0.16	0.29	0.22	0.09	0.47	0.68	0.66	0.11	0.72	1.21	1.18	1.01
Gap <sup>2</sup>	0.02	0.04	0.03	0.03	-0.10	-0.04	-0.03	-0.01	0.00	0.03	0.04	0.03

<sup>1</sup> Under current debt composition. <sup>2</sup> Represents the difference between stress under 2002 debt composition (counterfactual) and stress under current debt composition.

Source: Authors' calculations based on national data.

Why is the red line misleading? We have seen in the counterfactual exercise that netting out pure composition effects would have resulted in a lower debt ratio in the case of Brazil, owing to the sustained real exchange rate appreciation. Thus, we have to compare the effective lower reduction in debt due to the proactive debt management policies to the prospective gains during a financial crisis. More precisely, the green line represents the debt dynamics assuming no pure composition effect – as in the red line – plus the level of debt resulting from the counterfactual exercise. This, in our view, is the right gauge to measure vulnerability reduction due to proactive debt management. In practical terms, this amounts to taking the end-point of the green line as a reference and projecting it forward under the stress scenario.

The green line thus extended has a path similar to the red line, but it starts from a lower level. Consequently, the difference in the debt ratio is very small in the first year, and then widens to around 10 pp of GDP. We can take this figure as the net gain from Brazil's debt management policy. In other words, the short-term costs of implementing proactive policies in order to decrease the share of forex debt in total debt are more than compensated for by the long-term gains of implementing them.

For the other five countries, the forecasts under the baseline scenario are as follows. Colombia, Turkey and Uruguay decrease their debt towards 40%, 45% and 60% of GDP, respectively (blue line). Despite the evolution of its currency and the composition of its debt, Indonesia also reduces its debt to 25% of GDP. Finally, the forecast for Russia is especially favourable, as the gross debt decreases sharply to 25% of GDP – that is, not only is quasi-gross debt negative, but so is gross debt.

We can employ the stress scenario for the remaining countries in the same manner, although the results are less clear. Recall that the more interesting conclusions derive from comparison of the evolution of debt under the debt composition of the year of crisis (green line) and under the debt composition of 2005 (orange line). The comparison favours debt recomposition only in Russia, where the debt level is not currently a problem, and in Uruguay, to a lesser extent than in Brazil (see Table 4). Nevertheless, in some countries, such as Colombia, the benefit of the proactive policies implemented until 2005 gives rise to a scant average decrease in debt of 1 pp of GDP accumulated in the forecasted period. In the case of Turkey the accumulated differences after three years are negative (–1 pp GDP), although they were previously positive. In the case of Indonesia, the gap is negligible throughout the forecast scenario.

It is important to keep in mind here the caveats we mentioned above because the direct inference from these results is that, except for Brazil, debt recomposition efforts do not seem to pay off in terms of vulnerability reduction under stress. Again, we base these caveats on the impact of these debt trajectories on expectations. It is difficult to assume that the reaction of the markets would be the same comparing the mild deterioration implied by the orange line with the sharp increase in debt under a less favourable debt structure. As a consequence, the evolution of the financial variables is reasonably expected to be worse in the second case. This endogeneity implies that the computation of net gains is a floor rather than a midpoint estimate.

To check the robustness of the stress test, we repeat the exercise, considering two alternative assumptions for the design of the stress scenarios. First, following the methodology employed in most of the IMF's Article IV, we add two standard deviations from the sample series to the corresponding data of the baseline scenario, denoted as 2SD.<sup>12</sup> Second, we build a scenario on the average stress scenario (average stress, for short) for each variable of the six countries based on the historical criterion of the previous subsection.

---

<sup>12</sup> Two standard deviations from the sample of each variable from the year of crisis to 2005 are added to each variable from 2006 to 2008 (both inclusive).

Table 4 shows the outcomes corresponding to these two new criteria. The results in general are quite robust under the three different alternatives, in terms of both the size of the shock and the direction vis-à-vis the two new stress scenarios designed. Indonesia and Turkey are the exceptions. For Indonesia, the exercise is not robust under the assumption of average stress, as public debt to GDP is lower under the stress scenario than under the baseline scenario. For Turkey, the gap between the stress under the debt structure of the year of crisis – that is, the counterfactual scenario – and the stress under the debt structure of 2005 becomes negative, implying less resilience to a negative shock. For the other simulations, the results are almost the same and, in some cases – such as the results of the scenario based on averages for Colombia – show a lower debt under the current composition than under the previous composition.

## 5. Conclusions

In this paper, we have evaluated the impact of the shift of public debt away from foreign currency on the vulnerability of a group of selected emerging countries, which not so long ago underwent deep financial turbulence.

We first emphasised that the ratio of public debt to GDP and, even more dramatically, the share of forex debt have been reduced in these emerging markets in a context of favourable financial conditions. Exchange rate appreciations helped to reduce both ratios. However, the proactive debt management of fiscal authorities – aimed at reducing the vulnerability of the debt composition – has been the dominant factor in quantitative terms in most of these countries. Clearly, a favourable external environment and exchange rate evolutions have facilitated this process, since expected exchange rate appreciation favours issuing debt in domestic currency. The development of local debt markets has both benefited from and facilitated this proactive debt management.

The changes in debt structure are expected to have important implications for the reduction of financial vulnerability in public finances. However, our approach to this issue has uncovered a paradox related to the recent bias towards local debt. By reducing forex debt through proactive policies, governments have not taken full advantage of the real exchange appreciation enjoyed by their economies after the crises. Otherwise, the debt ratios in the analysed countries would have been lower than they are currently – and the difference is sizeable in certain cases.

This opportunity cost underscores the dramatic shift in debt management strategies in most of these countries. In the past, governments used periods of benign external financial conditions to issue external debt, usually beyond what would be advisable and prudent from a fiscal point of view, and have thus set the stage for future financial problems and crises. They are now prepared to refrain from this temptation and even to dismiss part of the impact of the exchange rate appreciation on the debt ratios in the short term in order to strengthen their underlying financial position. This change in strategy thus contributes to a structural reinforcement of public finances and helps countries redeem themselves from the “original sin.”

Fiscal authorities and analysts must take into account this short-term “opportunity cost” of shifting towards local debt so that they can assess the net benefits of proactive debt management policies. The stress tests suggest that even after controlling for these short-term costs, there is a reduction in vulnerability derived from the proactive shift towards local debt, measured in most cases by the difference in the ratio of debt to GDP in a situation of stress, although the magnitude in ratio for some of the countries analysed is small.

In interpreting the results, we have to take into account some qualifications. First, there is an important caveat that reinforces these results. Built into this exercise is a central assumption: the evolution of the variables that drive the debt-to-GDP ratio is independent of the ratio or

structure of debt. However, the behaviour of the financial variables is very much influenced by perceptions of debt vulnerability, a situation that is true both in the counterfactual and in the stress tests. More precisely, with a higher share of forex debt, the exchange rate appreciations would presumably have been lower in the later years and the deterioration of the financial variables in the stress test would have been higher. Another qualification is that the probability of turbulence is expected to increase under a debt structure very sensitive to financial volatility. These caveats taken together imply that the estimated reduction in vulnerability is a minimum boundary, and therefore that the effective vulnerability reduction is higher.

On the whole, we showed that the move to local debt is positive in terms of vulnerability reduction. This finding can be considered an important breakthrough in emerging markets and used to improve their resilience in the face of eventual financial shocks as well as to reduce the shocks' occurrence.

## References

Alfaro, L and F Kanczuk (2006): *Sovereign debt: Indexation and maturity*, Inter-American Development Bank (IADB) Working Paper no 560.

De Bolle, M, B Rother and I Hakobyan (2006): *The level and composition of public sector debt in emerging market crises*, IMF Working Paper 06/186.

Calvo, G, A Izquierdo and E Talvi (2002): *Sudden stops, the real exchange rate and fiscal sustainability: Argentina's lessons*, NBER Working Paper 9828.

Celasun, O, X Debrun and J Ostry (2006): *Primary surplus behaviour and risks to fiscal sustainability in emerging market countries: a "fan-chart" approach*, IMF Working Paper 06/67.

Cowan, K, E Levy-Yeyati, U Panizza and F Sturzenegger (2006): *Sovereign debt in the Americas: new data and stylized facts*, IADB Working Paper no 577.

Eichengreen, B and R Hausmann (1999): "Exchange rates and financial fragility", in Federal Reserve Bank of Kansas City (ed.), *New Challenges for Monetary Policy*, pp 329–68.

García, M and R Rigobon (2004): *A risk management approach to emerging markets' sovereign debt sustainability with an application to Brazilian data*, NBER Working Paper series no 10336.

Hostland, D and P Karam (2005): *Assessing debt sustainability in emerging market economies using stochastic simulation methods*, IMF Working Paper 05/226.

Inter-American Development Bank (IADB) (2006): "Living with debt. How to limit the risks of sovereign finance", in E. Borensztein, E. Levy and U. Panizza (coords), *Economic and social progress in Latin America: 2007 report*.

International Monetary Fund (IMF) (2003): *External debt statistics: Guide for compilers and users*, June.

——— (2003–2006): Article IV Staff Country Reports, various, [www.imf.org](http://www.imf.org).

——— (2006): *World Economic Outlook (Financial Systems and Economic Cycles)*, September.

*LatinFocus Consensus Forecast* (2006), July.

Jeanneau, S and C Tovar (2006): "Domestic bond markets in Latin America: achievements and challenges", *BIS Quarterly Review*, June.

Manasse, P and N Roubini (2005): “*Rules of thumb*” for sovereign debt crises, IMF Working Paper 05/42.

Tovar, C (2005): “International government debt denominated in local currency: recent developments in Latin America”, *BIS Quarterly Review*, December.

# Plumbing for Latin American capital markets<sup>1</sup>

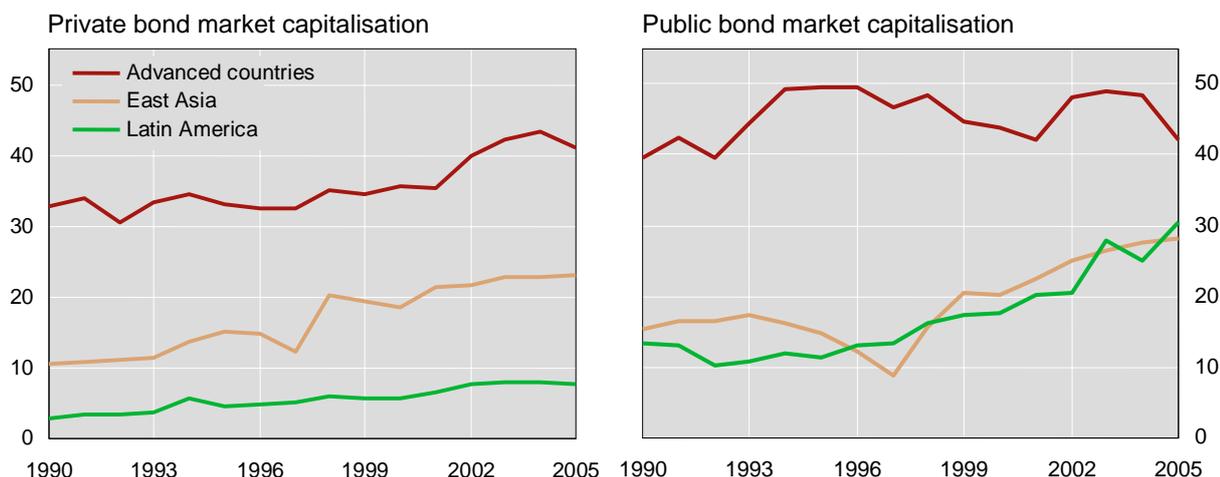
Sudarat Ananchotikul and Barry Eichengreen

## 1. Introduction

If publicity is the measure of progress, then Latin American capital markets are booming. The financial press is awash with articles on the growth of local Latin American markets. They note that capitalisation of domestic bond markets in the seven large Latin American countries more than doubled from 1995 to 2005; in the second half of the period alone, it went up by more than 60% (see Figure 1). Stock market capitalisation rose by 52% during that same period, and trading value, averaged across countries, rose by 86%. Furthermore, foreign participation in these markets is booming (see Figure 2).

Figure 1

### Bond market capitalisation by region<sup>1</sup>



“Advanced countries” refers to Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States; “East Asia” refers to China, Hong Kong SAR, Indonesia, Korea, Malaysia, Philippines, Singapore and Thailand; “Latin America” refers to Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.

<sup>1</sup> As a percentage of GDP.

Sources: World Bank (2007), *World Development Indicators*.

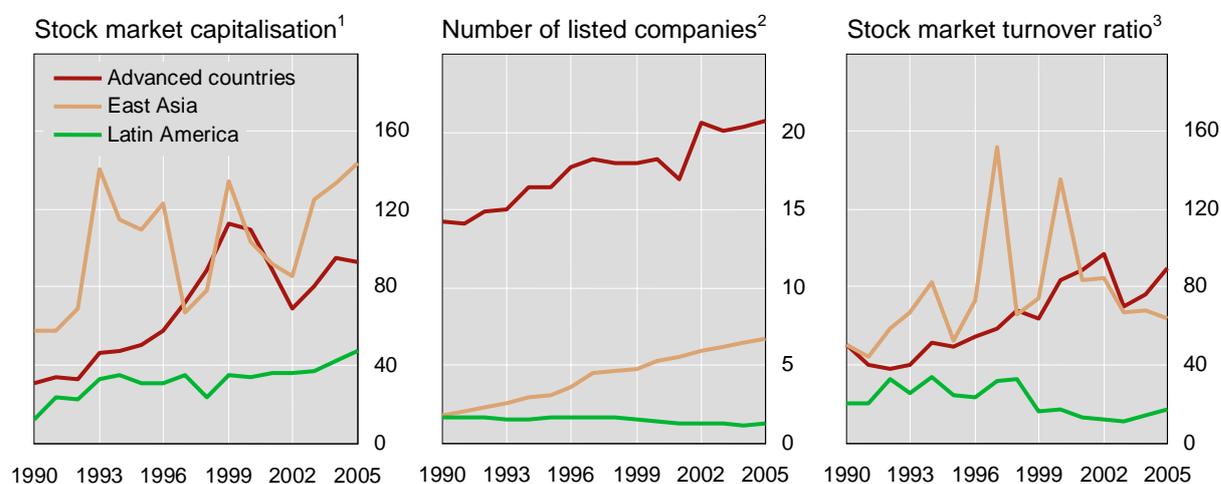
However, measured by levels rather than rates of change and compared with other regions, capital market development in Latin America continues to be disappointing. Bond markets relative to GDP are small when compared not only to advanced industrial countries but also

<sup>1</sup> The authors are affiliated with the Bank of Thailand and the University of California, Berkeley, respectively. This paper was prepared for the BIS-Federal Reserve Bank of Atlanta meeting on “New financing trends in Latin America: a bumpy road towards stability” held in Mexico City, 24–25 May 2007. We thank conference participants for their comments, as well as Kenichi Ueda for advice regarding data and Pipat Leungaruemitchai for help in obtaining them.

to emerging East Asian markets.<sup>2</sup> The most developed segment is government bonds, reflecting Latin America's history of deficits. Although some countries, like Mexico, have successfully issued fixed-rate bonds and lengthened maturities, many others have maintained sovereign debt that is short in duration and variable in rate. Furthermore, by the standards of its government bond markets, the region's corporate bond markets are minuscule, whether measured by capitalisation, the number of firms issuing bonds or foreign investor participation.<sup>3</sup> Maturities in this market segment are especially short. Scarcely 10% of corporate bonds issued in Latin America during 2000–05 were at fixed rates and of either medium- or long-term duration, compared to nearly 90% of those issued in emerging East Asia. Many corporate debt securities are not traded for extended periods. The absence of current price quotes prevents institutional investors required to market on a regular basis from holding such securities, further limiting liquidity through the operation of a destructive feedback loop.

Figure 2

**Evolution of stock markets by region**



For a list of countries included in each region see Figure 1.

<sup>1</sup> As a percentage of GDP. <sup>2</sup> Total of listed companies in the region at end-year, in thousands. <sup>3</sup> Value of shares traded as a percentage of average market capitalisation.

Sources: World Bank (2007), *World Development Indicators*.

Latin American equity markets are similarly dominated by a small number of companies.<sup>4</sup> Unlike in other regions, the number of companies listed on local markets has been falling. Equity market capitalisation scaled by GDP is less than a third of that in emerging East Asia. Only Chile and perhaps Brazil are doing tolerably well. Liquidity, as measured by bid-ask spreads and turnover, remains low; in 2005 the value of shares traded (relative to stock market capitalisation) was a mere 17%, compared to 106% in the G7 countries and 64% in East Asia (see Figure 2).

Inevitably, a balanced assessment yields something of a glass-half-full, glass-half-empty picture. While Latin American countries are making progress in developing their financial

<sup>2</sup> Data on the comparison may be found in Eichengreen et al (2006).

<sup>3</sup> As documented by the International Monetary Fund (IMF) (2005).

<sup>4</sup> There are barely a quarter as many listed companies in Latin America as in emerging East Asia (de la Torre et al 2007, Figure 3).

markets, they are starting out behind other regions. In fact, in terms of a number of important indicators – eg corporate debt issuance, stock market capitalisation, and regional stock market turnover – the current situation is unsatisfactory.

There is no shortage of explanations for this situation. Many Latin American countries have long histories of macroeconomic instability, evidenced by chronic budget deficits, high inflation and volatile business cycles. In addition, macroeconomic instability is often accompanied by financial instability in the form of banking, debt, and currency crises,<sup>5</sup> which have in turn led to the collapse of profitability and hence of share prices, as well as involuntary restructurings whereby governments have unilaterally reduced the claims of bondholders. On top of this, governmental instability in the region has caused unpredictable changes in investor rights and undermined the security of creditor claims. Against this backdrop, it is not surprising that investors have shown little enthusiasm for participating in Latin American capital markets.

At a deeper level, the underdevelopment of financial markets reflects the limits of the supporting infrastructure, or what might be called the “plumbing” of capital markets. Investor rights are weak; shareholders often have limited voting rights, making it difficult to challenge entrenched management. Judicial proceedings are opaque and uncertain, rendering bankruptcy procedures time-consuming and expensive and making it difficult for creditors to recover principal and interest arrears and to attach collateral. According to conventional measures of investor and creditor protection, Chile, the highest-ranked Latin American country, has values that are below the average for emerging East Asia.<sup>6</sup>

Another problem related to infrastructure is that clearing and settlement systems, especially in the region’s smaller markets, are often underdeveloped. An efficient clearing and settlement system involves trade matching to ensure that the orders booked by the buyer and the seller are identical and can be accepted by an exchange’s clearing house for settlement; a delivery-versus-payment process that ensures that transfers of securities and cash are final and certain; and a central securities depository that operates an electronic book-entry system, permitting the physical movement of actual securities to be limited. Such an infrastructure would certainly make participation in the local market more attractive. Mexico, Brazil, and Argentina have made significant progress in this area, but other countries lag behind.

Trading platforms are similarly inefficient or underdeveloped, and information on transactions is often limited. Countries in other parts of the world have made a significant effort to address problems like this. Malaysia, for example, has established a bond information trading system in which dealers are required to enter price and quantity information within 10 minutes of completing a trade; this information then becomes available to other screen subscribers. The Thai Bond Market Association requires traders to report transactions within three minutes and distributes this information to its members four times a day. South Korea operates a similar system, and Indonesia plans to move in the same direction.<sup>7</sup>

One of two approaches could foster Latin American capital markets. The first approach would be hands-off: with recent movements towards macroeconomic and financial stability and improvements in sustained growth, it is probably just a matter of time before the markets develop. The second would be more direct, addressing the infrastructure needs of local

---

<sup>5</sup> The singularity of Latin America when viewed from the perspective of financial instability is a theme of Zettelmeyer (2006).

<sup>6</sup> See Borensztein et al (2006).

<sup>7</sup> Some countries, such as Peru, are using tax incentives to encourage exchange-based trading of corporate bonds as an alternative to the use of over-the-counter transactions, on the grounds that exchange-based trading is an important first step towards the timely provision of information on transactions (IMF 2005).

markets – in other words, fostering their operation by fixing the “plumbing.” With the proper infrastructure in place, it would be easier to eliminate the remaining shortcomings of the region’s markets, whether they be the difficulty of issuing long-term fixed-rate corporate debt securities, the small number of listed firms or the dearth of liquidity.

This paper documents the challenges and rewards of addressing these plumbing problems, taking corporate governance reform as a case study. We first describe the progress that has taken place in corporate governance reform. We then address the question of why progress has not been faster. Finally, we explore the benefits of such reform for the development of capital markets. Throughout, we draw comparisons between Latin America and East Asia, Europe, and the United States.

## 2. Corporate governance as a case study

Corporate governance lends itself to the study of financial market plumbing for several reasons. First, the multilaterals cite problems in corporate governance as an explanation for financial instability and the underdevelopment of financial markets. Official post-mortems on the Asian crisis described the shortcomings of corporate governance.<sup>8</sup> These post-mortems blamed principal-agent problems for the extensive leverage and excessive dependence on short-term foreign-currency-denominated debt that rendered the corporate and financial sectors so fragile. They pointed to inaccurate information about corporate finances as an explanation for why investors scrambled out of Asian markets. Subsequently, the World Bank, International Monetary Fund (IMF), Organisation for Economic Co-operation and Development (OECD), and Bank for International Settlements (BIS), among others, stressed the need for corporate governance reform.<sup>9</sup>

Similarly, weaknesses in Latin American corporate governance are widely cited as an explanation for why the region does not have larger capital markets. Financial transparency is lacking among publicly traded companies and issuers of debt, creating scope for management and directors, working together, to appropriate the residual cash flow of the firm at the expense of outside investors. Moreover, minority investors have limited ability to capture the residual cash flow of the firm even when they know that it exists. They have limited voting rights. Typically they must marshal a relatively large share of investors in order to call an extraordinary shareholders’ meeting. Even then, shares are often blocked before the shareholders’ meeting.<sup>10</sup> All this makes it difficult for minority shareholders to challenge the decisions of management and a captive board of directors. Given the ease with which cash flow can be disguised and the difficulties that investors face when attempting to assert their rights, it is not surprising that Latin America does not have larger capital markets.

Second, effective corporate governance is not something that can be legislated. Rather, it emerges from the interplay of the public and private sectors. Regulators can establish guidelines for governance – voting rules, the appointment of independent directors, and so forth – but how decisions are reached and how those making them are held accountable depends on how firms implement those decisions and on how investors react. Corporate

---

<sup>8</sup> See, for example, World Bank (1998).

<sup>9</sup> A representative compendium of OECD work on reforming corporate governance can be found at [www.oecd.org/topic/0,2686,en\\_2649\\_37439\\_1\\_1\\_1\\_1\\_37439,00.html](http://www.oecd.org/topic/0,2686,en_2649_37439_1_1_1_1_37439,00.html).

<sup>10</sup> Capaul (2003) provides a description of the problem, with considerable country detail.

governance thus epitomises the challenges of reform in a world where outcomes depend not only on official decisions but also on market reactions.<sup>11</sup>

Third, high-profile management scandals in the United States are a reminder that even countries with sophisticated financial markets have corporate governance problems. Insofar as the United States has not been able to solve this problem, we might reasonably ask whether it is realistic to ask emerging markets to do so.

Fourth, there is disagreement on how best to provide effective corporate governance and therefore on what reforms are desirable. Even among advanced countries with relatively sophisticated financial markets – in particular, the United States and European countries – there is disagreement on the specifics of corporate governance reform. This lack of agreement in part reflects different analytical perspectives. However, it also results from differences in economic structure – for example, the fact that bank-based financial systems remain more prevalent in Europe.<sup>12</sup>

Similarly, in the context of the emerging market, questions arise about the suitability of one-size-fits-all governance reform advice. Legislation and regulations tailored to the circumstances of high-income countries may have very different effects in Latin America, where information is not forthcoming, cross-shareholding is common, and family control is pervasive. Governance that relies on the accurate and timely provision of accounting information may be ill-suited where the supply of independent accountants and auditors is limited and the accounting profession's self-regulatory body is weak.<sup>13</sup> Furthermore, attempting to prevent management from pursuing private agendas by giving large shareholders more power may not work in an emerging market setting where the firms are heavily family-owned and -controlled, the majority owner is the manager and the problem instead is the exploitation of outside shareholders by large blockholders.<sup>14</sup> As Capaul (2003) notes, family-owned and -run firms continue to dominate the listed sector in many Latin American countries. Observations like these prompt questions about the suitability for the region of advanced-country models.

## 2.1 Analysis

Our analysis makes use of the work of de Nicolo et al (2006). These authors have constructed outcome-based measures of the quality of corporate governance for a wide sample of countries for the period 1994–2003. “Outcome-based” means looking not at legislation but at what firms and markets actually do. This indicator of corporate governance quality has three components:

- (1) The share of the 40 most important accounting items, as identified by the Center for International Financial Analysis and Research of Princeton University, on which the largest companies (top 10 manufacturing companies as measured by total assets in each country) disclose information. The idea here is that greater accounting transparency means that individual investors have more information about the ability of the firm to meet its debt service obligations and about residual cash flow.

---

<sup>11</sup> A recent study for the Asian economies (Cheung and Jang 2005) actually reports a negative correlation between how countries rank in terms of the adequacy of corporate governance rules and regulations and the adequacy of actual practice as seen by investors.

<sup>12</sup> On this, see Enriques and Volpin (2007).

<sup>13</sup> See Alba et al (1998).

<sup>14</sup> These problems of self-dealing, or tunnelling, are the focus of Johnson et al (2000).

- (2) A measure of earnings smoothing, constructed as one minus the Spearman rank correlation between changes in cash flow (before accounting adjustments) and changes in profits (after accounting adjustments), both normalised by total assets, for each country and year. This speaks to the fact that accounting transparency may be meaningless if accounts are easily manipulated.
- (3) A measure of stock price synchronicity constructed from the covariation of each firm's weekly return with the market capitalisation-weighted weekly return. The idea in this case is that when firms make little information available about their financial condition, investors will be forced to infer the facts from economy-wide developments, causing share prices for different firms to move together.<sup>15</sup>

Like any summary measure of something as multifaceted as corporate governance, this one has its limitations. The number of items on which firms disclose accounting information tells us nothing about the accuracy of that information. Estimating earnings smoothing is more difficult for emerging markets than it is for advanced countries because of the absence of information on cash flow for many firms. Individual stock prices can move together to a greater or lesser extent for reasons other than the limited availability of information on individual firms' outcomes and prospects – for example, because of changes in the prevalence of common stocks.

Other limitations relate to the fact that the three measures making up the index all focus on transparency about information relevant to estimating residual cash flow, which is the variable ultimately of interest to shareholders. Better accounting means more information about the magnitude of residual cash flow; a higher correlation between underlying cash flow and profits as reported similarly tells us about the payout to which shareholders are entitled. But neither measure tells us about the ability of investors to capture that residual cash flow, which might be diverted by management and captive directors if voting rights are weak and legal enforcement is costly and time-consuming. Whether the valuations of different firms move together is arguably more informative about these last aspects of corporate governance. The prices of the shares of individual companies will co-vary with one another not only when outside investors have relatively little information about the financial condition of individual firms, leading them to infer it from economy-wide conditions, but also when they are not confident of being able to capture idiosyncratic variations in cash flow. But this measure of the dispersion of individual share prices is subject to the other problems described above.

Notwithstanding these limitations, we would argue that the outcome-based measure of de Nicolo et al (2005) tells us more about what firms and investors do than do the statute- and regulation-based alternatives.<sup>16</sup> This index and its components are available for 41 countries, including 19 emerging markets (10 of which are in Asia), annually for the period 1994–2003. Using the same sources and following the same methods as these authors, we updated the three sub-indices through 2005.

The evolution of corporate governance for the full sample, individual regions, and emerging and advanced countries is shown in Table 1 and Figure 3. There appear to have been improvements in corporate governance in both Asia and Latin America, although progress has been a bit slower in Asia. This advancement suggests a tendency towards convergence in corporate governance quality across emerging regions. Latin America and Asia both experienced relatively little improvement prior to 1998,<sup>17</sup> and then faster progress

---

<sup>15</sup> And giving management greater scope for diverting residual cash flow.

<sup>16</sup> This index also has some strengths relative to its predecessors. For example, it does not focus exclusively on share price co-movements (as in Morck et al 2000) or accounting practice (as in Cheung and Jang 2005).

<sup>17</sup> Latin America even experienced some retrogression.

subsequently, which suggests that later reforms were prompted not only by the Asian crisis but also by the general push from the multilaterals and the pressures of financial globalisation. We report some further evidence on this below.

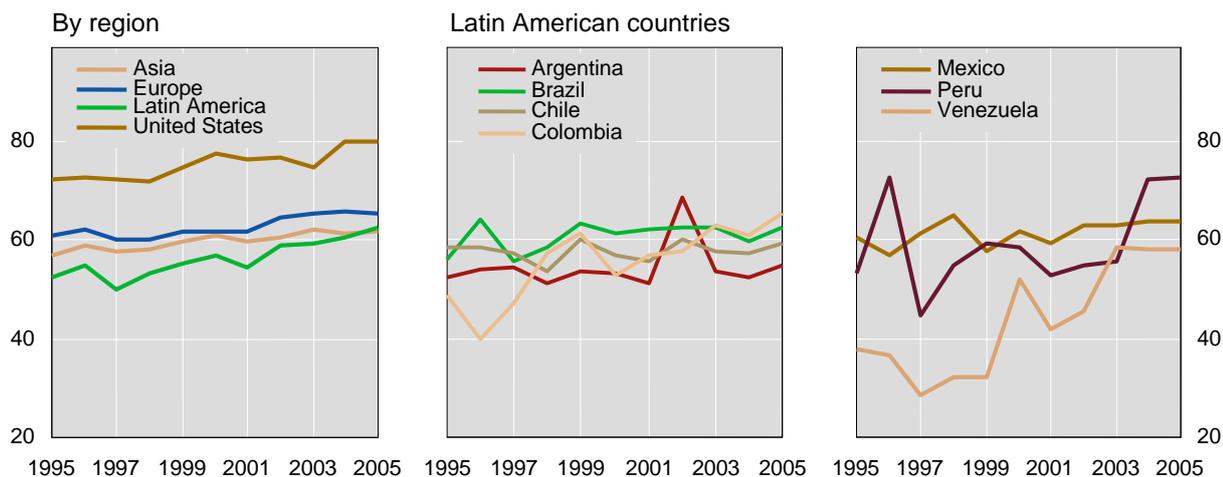
Table 1  
Evolution of corporate governance quality (CGQ), 1995–2005

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>All</b>	<b>58.7</b>	<b>60.2</b>	<b>58.0</b>	<b>58.9</b>	<b>60.7</b>	<b>61.1</b>	<b>61.0</b>	<b>63.2</b>	<b>63.9</b>	<b>64.7</b>	<b>65.2</b>
Asia	57.0	58.8	57.7	58.2	59.7	60.7	59.9	60.7	62.2	61.3	61.7
Latin America	52.4	54.7	50.0	53.2	55.4	56.7	54.3	58.9	59.1	60.6	62.4
Europe	60.9	62.2	59.9	60.0	61.9	61.7	61.6	64.6	65.2	65.9	65.5
Others	62.8	63.3	62.9	63.6	65.3	65.7	69.0	68.6	69.0	72.0	74.0
Emerging markets	55.4	57.5	54.5	56.2	57.5	58.3	57.4	59.3	60.4	60.9	61.6
Advanced countries	61.0	62.1	60.5	60.8	63.0	63.2	63.5	65.9	66.4	67.3	67.8
<i>Memo:</i>											
<i>United States</i>	72.2	72.6	72.3	71.9	74.8	77.7	76.5	76.7	74.6	79.8	79.9
<i>Japan</i>	57.2	59.3	59.8	62.0	64.2	63.8	62.9	65.7	64.0	64.4	66.4

See Appendix Table A2 for grouping of sample countries by region.

Source: Corporate governance indices from 1995 to 2003 from de Nicolo, Laeven, and Ueda (2006), extended through 2005 by authors.

Figure 3  
Corporate governance index (CGQ)<sup>1</sup>



For a list of countries included in each region see Figure 1.

<sup>1</sup> CGQ index ranges from 0 (worst) to 100 (best)

Source: De Nicolo, Laeven and Ueda (2006); 2004 and 2005 figures updated by authors.

Of interest are the improvements in the quality of corporate governance as measured by this index in several Latin American countries (see Figure 3). Our outcome-based measures suggest the largest improvements in Colombia, Peru, and Venezuela. Interestingly, the efforts of regulators and the stock exchange in São Paulo (the Bolsa de Valores de São Paulo, or BOVESPA) to upgrade transparency in Brazil do not yet show up in terms of visibly improved corporate governance quality.<sup>18</sup>

## 2.2 Determinants

We next address the question of why progress has been more rapid in some places than in others. We regress corporate governance quality on a vector of country-specific economic and political characteristics and include alternative measures of the political system such as the stability of the government and the Polity Index, which measures the degree to which the regime is democratic or autocratic. We also include past capital inflows as a measure of the importance of foreign investors, who can be active in pressing for improvements in corporate governance. Indicators of trade and financial openness similarly speak to the question of whether more contact with foreign markets creates pressure for better corporate governance quality. Per capita GDP (in logs) is a proxy for the general level of economic and financial development. Following La Porta et al (1998) and Chong and Lopez-de-Silanes (2007), we include the origin of the legal system as a predetermined influence on the strength of investor rights. Credit provided by the banking system is a measure of the development of financial intermediation and speaks to whether banks and capital markets are substitutes or complements. The level of the lending rate captures both the competitiveness of the banking system and the degree of macroeconomic stability. The number of parent enterprises is a proxy for the population of large firms in a country. Finally, we consider some individual indicators of financial stability: the stability of the exchange rate, whether there has been a recent banking crisis, and the number of years the country has been under an IMF programme.

Table 2 shows summary statistics on these variables; Table 3 shows the correlation matrix; and Table A1 presents further information on definition and sources. We plot a number of these variables in Figures 4 and 5. The first panel of Figure 4 confirms our hypothesis that corporate governance improves with per capita GDP, which is a proxy for the general level of economic and institutional development. A number of Latin American countries – including Argentina, Colombia, Chile, and, most visibly, Venezuela – are negative outliers from the general relationship. This is indicative of the poor quality of corporate governance in the region, even when we control for general levels of economic and institutional development.<sup>19</sup>

---

<sup>18</sup> In 2001 the BOVESPA created the Novo Mercado as a mechanism to enable firms to become listed by signalling the high quality of their corporate governance. Companies listed on the Novo Mercado must comply with one-share, one-vote rules; abide by international accounting standards; and have a free float (a share of issues not in the hands of controlling shareholders) of at least 25%.

<sup>19</sup> Multiple regression, below, will help to determine whether this deviation is significant.

Table 2  
Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Corporate governance quality (0 to 100)	451	61.42	7.17	28.60	89.20
Accounting standards (0 to 100)	435	84.21	4.06	66.30	93.35
Earnings smoothing (0 to 100)	451	19.22	12.04	0.00	101.01
Stock price synchronicity (0 to 100)	451	82.25	10.35	38.50	96.00
Private bond market capitalisation (% GDP)	439	24.86	26.42	0.00	145.62
Public bond market capitalisation (% GDP)	439	36.47	24.86	0.21	147.89
Stock market capitalisation (% GDP)	451	77.88	72.51	3.61	566.18
Number of listed companies	451	858	1428	50	8851
Stock turnover ratio	451	72.41	68.74	1.31	623.59
Government stability index (0 to 12)	451	8.73	1.82	4	12
Polity index (-10 to 10)	451	7.74	4.07	-7	10
Cumulative capital inflows (% GDP)	451	33.04	40.42	0.63	299.88
English legal origin dummy	451	0.34	0.47	0	1
Real GDP per capita (in log)	451	8.84	1.92	0.12	10.90
Domestic credit by banking sector (% GDP)	451	97.16	45.97	8.58	258.50
Lending interest rates	451	13.02	14.76	1.68	103.30
Number of parent enterprises	451	1483	2097	0	9356
Financial openness	451	7.03	10.23	0.07	96.38
Trade openness	451	77.56	56.73	16.30	383.06
Exchange rate stability index (0 to 10)	451	8.96	1.82	0	10
Cumulative years under IMF programmes	451	1.34	3.79	0	23
Currency crisis indicator	451	0.04	0.20	0	1
Banking crisis indicator	451	0.12	0.32	0	1

Data on private and public bond market capitalisation are unavailable for Israel throughout the sample period (1995–2005).

Sources: See Table A1 in the Appendix for data sources and definitions.

Table 3  
Correlation matrix

	Corporate governance quality	Government stability	Polity index	Cumulative capital inflows (% GDP)	Log real GDP per capita	English legal origin dummy	Domestic credit by banks (% GDP)	Lending rate (%)	Number of parent enterprises	Financial openness	Trade openness	Exchange rate stability	Banking crisis dummy
Government stability	0.112**	1.000											
Polity index	0.262***	-0.154***	1.000										
Cumulative capital inflows (% GDP)	0.126***	0.194***	-0.147***	1.000									
Log real GDP per capita	0.328***	0.022	0.388***	0.249***	1.000								
English legal origin dummy	0.242***	0.155***	-0.094**	0.308***	0.073	1.000							
Domestic credit by banks (% GDP)	0.310***	0.198***	0.185***	0.212***	0.495***	0.155***	1.000						
Lending rate (%)	-0.274***	-0.152***	-0.098**	-0.187***	-0.558***	-0.187***	-0.414***	1.000					
Number of parent enterprises	0.213***	0.002	0.182***	-0.145***	0.285***	-0.267***	0.338***	-0.163***	1.000				
Financial openness	0.123***	0.199***	-0.011	0.607***	0.289***	0.082	0.226***	-0.192***	0.009	1.000			

Table 3  
Correlation matrix (cont)

	Corpo- rate govern- ance quality	Govern- ment stability	Polity index	Cumula- tive capital inflows (% GDP)	Log real GDP per capita	English legal origin dummy	Domes- tic credit by banks (% GDP)	Lending rate (%)	Number of parent enter- prises	Financial open- ness	Trade open- ness	Exchange rate stability	Banking crisis dummy
Trade openness	0.078	0.152***	-0.196***	0.805***	0.190***	0.324***	0.285***	-0.254***	-0.119**	0.546***	1.000		
Exchange rate stability	0.126***	0.059	0.005	0.118**	0.388***	0.150***	0.185***	-0.538***	0.056	0.104**	0.131***	1.000	
Banking crisis dummy	-0.203***	-0.016	-0.195***	-0.109**	-0.311***	-0.074	-0.043	0.309***	-0.013	-0.138***	0.019	-0.196***	1.000
Years under IMF programmes	-0.162***	-0.057	-0.140***	-0.124***	-0.335***	-0.150***	-0.366***	0.175***	-0.198***	-0.144***	0.183***	-0.035	0.173***

The symbols \*, \*\*, \*\*\* indicate significance level at 10%, 5% and 1%, respectively.

Source: Authors' calculations.

The second panel of Figure 4 suggests that the quality of corporate governance rises with government stability. It suggests further that the poor quality of corporate governance in Mexico, Brazil, Venezuela and Colombia has been associated with low levels of government stability. Conversely, Colombia, Argentina and especially Venezuela deviate from the general relationship, suggesting that governmental instability does not account for everything.

The third panel shows that countries with more democratic governments are likelier to have effective corporate governance. However, Argentina, Colombia and Venezuela again do not fit the pattern. Cumulative capital flows are positively related to the quality of corporate governance, although it is possible that this relationship is driven by a few observations.

Finally, domestic credit provided by the banking system and the number of parent enterprises are positively related to the quality of corporate governance. It would be nice to be able to say whether the average relationship in Latin America is different from that of other regions. Unfortunately, we do not have a sufficient number of observations for Latin America to estimate the same equations separately for the region.

For the sake of comparison, Figures 5A and 5B show these same scatter plots separately by region.

We estimated the equations on the full sample with random effects. In doing so, we followed the Hausman and Breusch-Pagan tests, which show that random effects are more accurate than fixed effects and simple pooling.<sup>20</sup> Column 1 of Table 4 shows the benchmark specification. That countries with more stable governments appear to have better corporate governance may reflect the greater willingness of politicians to invest in the upfront costs of reform that yield returns down the road. In contrast, it does not seem to matter whether that government is more or less democratic. This is surprising, based on what we might observe from the simple bivariate relationship in the third panel of Figure 4. This finding is, however, consistent with the larger literature on the economic effects of democracy. Past capital inflows scaled by GDP translate into stronger present corporate governance, possibly because foreign investors press for improvements in practice.

In addition, countries with a common-law tradition have better corporate governance, reflecting the stronger rights and voice of outside shareholders and, presumably, their greater activism. Countries with low lending rates also appear to have relatively strong corporate governance. Low lending rates may reflect stable economic conditions, which means the government has more time and resources to devote to corporate governance rather than having to attend to other economic problems. Doidge et al (2004) observe that where external finance is more readily available, the incentives for firms to improve corporate governance are greater. Finally, the number of parent enterprises (that is, multinational enterprises with subsidiaries abroad) enters positively in the benchmark specification. This number is a proxy for the number of large corporations, which in turn reflects the level of corporate sector development. It is possible that countries with a greater number of large corporations are more pressed to place them under rigorous governance standards, and these firms are seen to be better able to comply with stringent regulation. Analogous to this, some countries may hesitate to enforce rigid governance standards because their many small- and medium-sized companies would find it costly to comply with the rules.

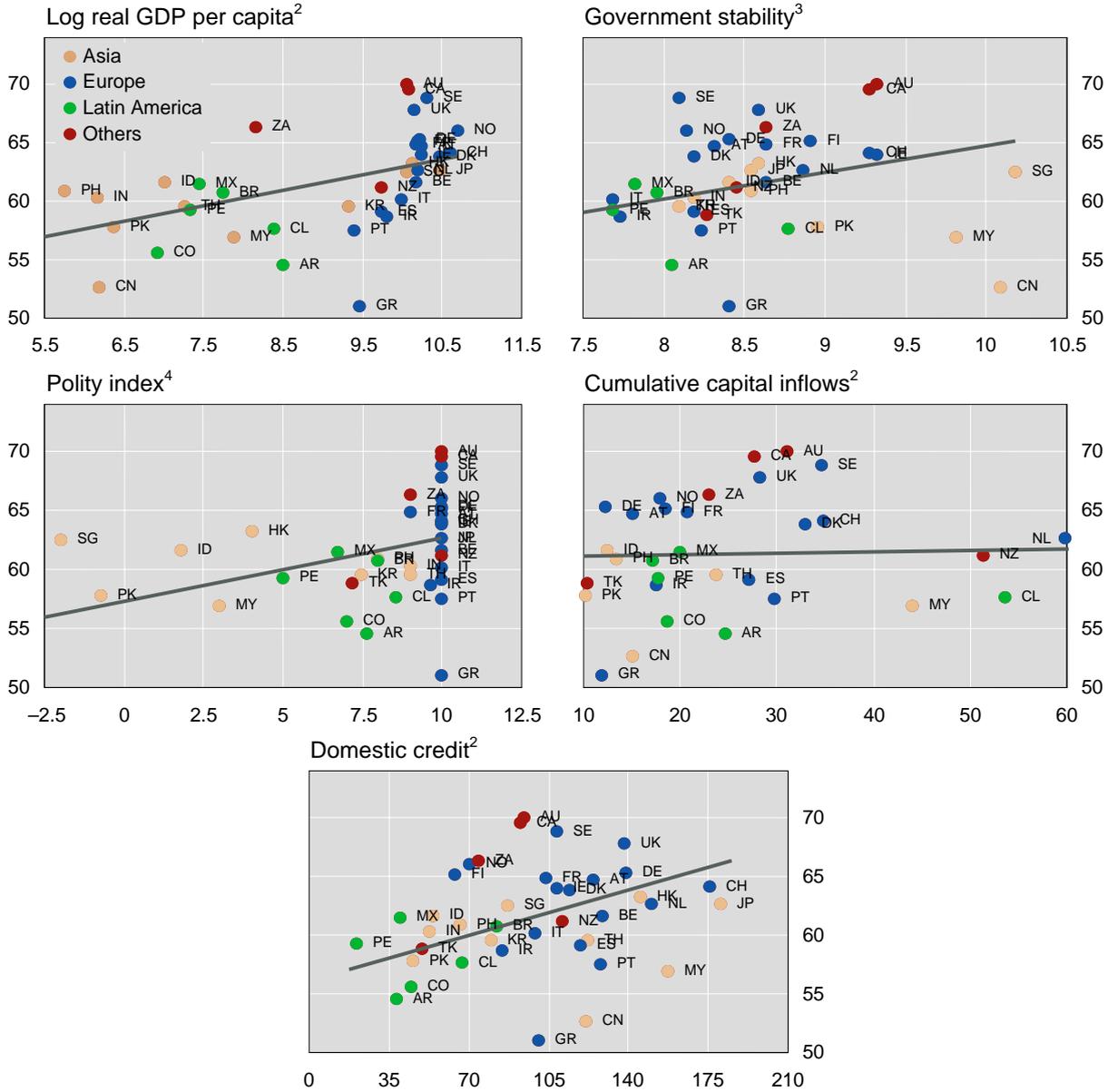
---

<sup>20</sup> Reassuringly, the key results carry over when we estimate these relationships instead, using fixed effects.

Figure 4

**CGQ index (y-axis) and explanatory variables (x-axis)<sup>1</sup>**

Cross section, average 1995–2005



Asia refers to China (CN), Hong Kong SAR (HK), India (IN), Indonesia (ID), Japan (JP), Malaysia (MY), Pakistan (PK), Philippines (PH), Singapore (SG), South Korea (KR) and Thailand (TH); Europe refers to Austria (AT), Belgium (BE), Denmark (DK), Finland (FI), France (FR), Germany (DE), Greece (GR), Ireland (IE), Israel (IR), Italy (IT), Netherlands (NL), Norway (NO), Portugal (PT), Spain (ES), Sweden (SE), Switzerland (CH) and United Kingdom (UK); Latin America refers to Argentina (AR), Brazil (BR), Chile (CL), Colombia (CO), Mexico (MX), Peru (PE) and Venezuela (VE); Others refers to Australia (AU), Canada (CA), New Zealand (NZ), South Africa (ZA), Turkey (TK) and United States (US).

<sup>1</sup> CGQ index (y-axis) against each variable (x-axis); CGQ index ranges from 0 (worst) to 100 (best).  
<sup>2</sup> Domestic credit by banking sector as a percentage of GDP. <sup>3</sup> The index ranges from 0 (least stable governments) to 12 (most stable governments). <sup>4</sup> The index ranges from -10 (strongly autocratic) to 10 (strongly democratic).

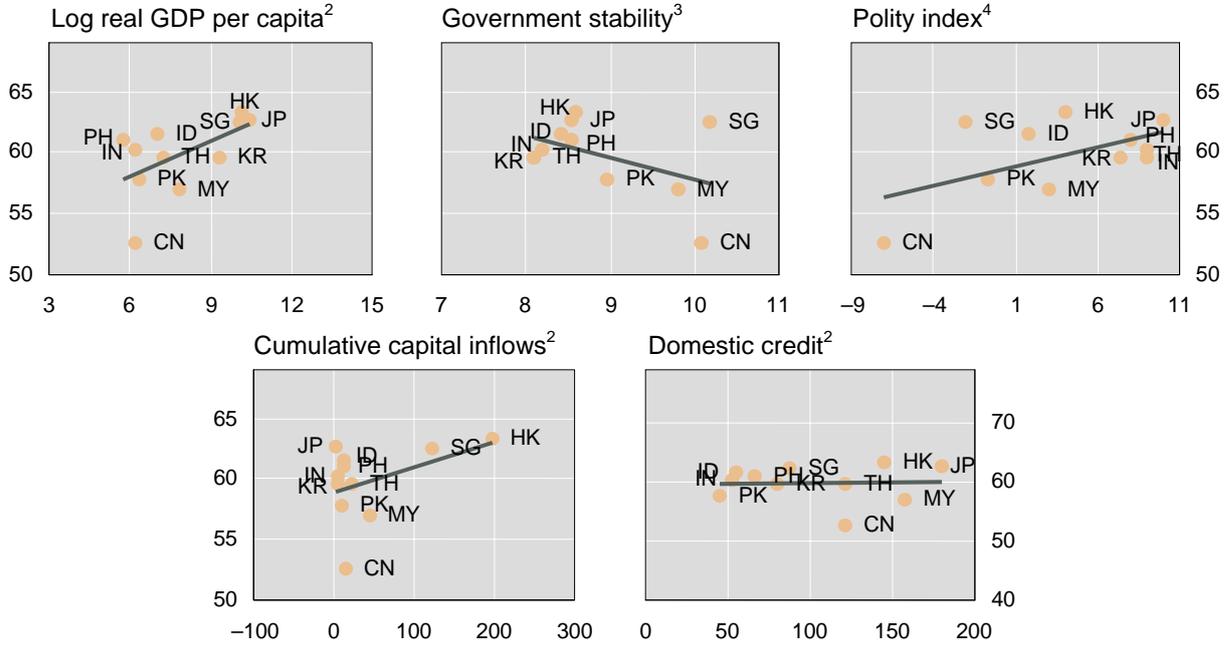
Sources: See Table A1 in the Appendix for data sources and definitions.

Figure 5A

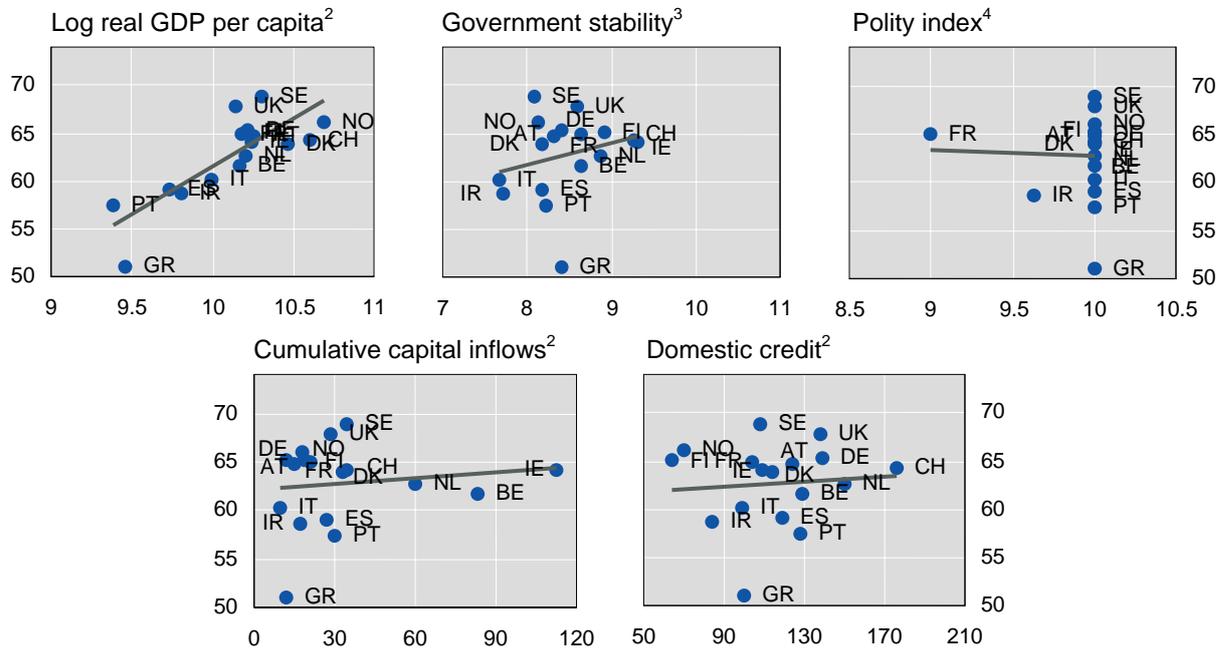
**CGQ index and explanatory variables in Asia and Europe<sup>1</sup>**

Cross section, average 1995–2005

**Asia**



**Europe**



<sup>1</sup> CGQ index (y-axis) against each variable (x-axis); CGQ index ranges from 0 (worst) to 100 (best). See Figure 4 for country codes. <sup>2</sup> Domestic credit by banking sector as a percentage of GDP. <sup>3</sup> The index ranges from 0 (least stable governments) to 12 (most stable governments). <sup>4</sup> The index ranges from -10 (strongly autocratic) to 10 (strongly democratic).

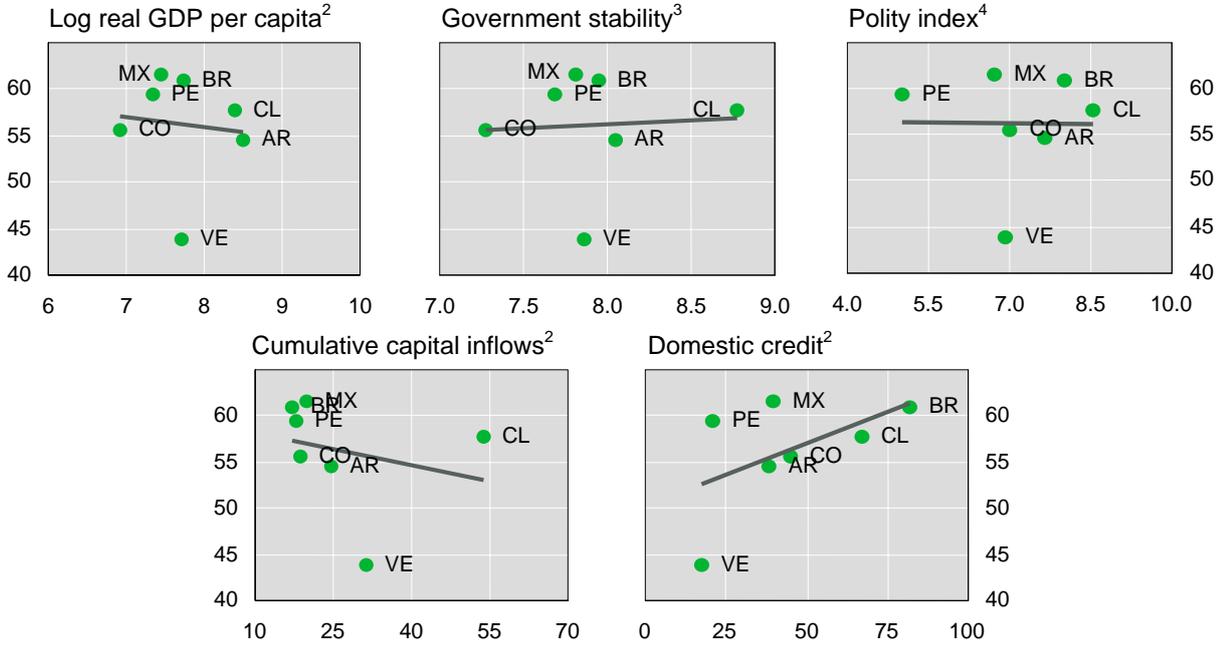
Sources: See Table A1 in the Appendix for data sources and definitions.

Figure 5B

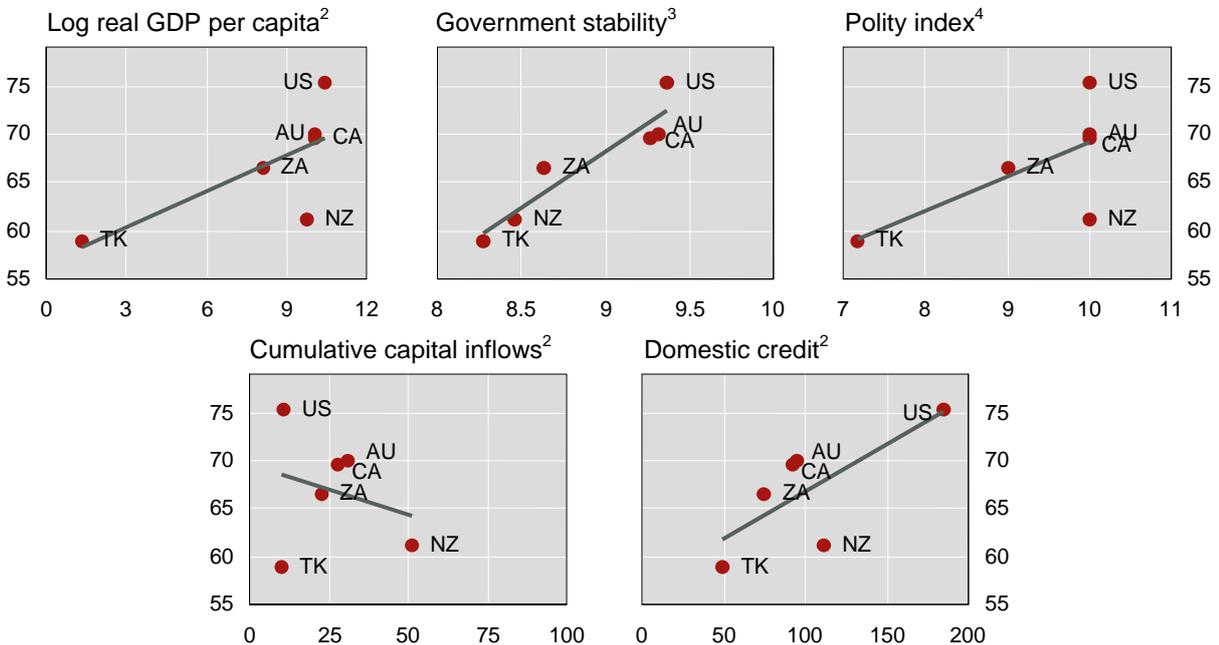
**CGQ index and explanatory variables in Latin America and other countries<sup>1</sup>**

Cross section, average 1995–2005

**Latin America**



**Other countries**



<sup>1</sup> CGQ index (y-axis) against each variable (x-axis); CGQ index ranges from 0 (worst) to 100 (best). See Figure 4 for country codes. <sup>2</sup> Domestic credit by banking sector as a percentage of GDP. <sup>3</sup> The index ranges from 0 (least stable governments) to 12 (most stable governments). <sup>4</sup> The index ranges from -10 (strongly autocratic) to 10 (strongly democratic).

Sources: See Table A1 in the Appendix for data sources and definitions.

Table 4  
**Determinants of corporate governance quality**  
 First stage, GLS random effects

	<b>Dependent variable: corporate governance quality (CGQ)</b>		
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
<b>Excluded instruments:</b>			
Government stability	0.234* (1.87)	0.130 (1.01)	0.127 (0.99)
Polity index	0.247** (2.20)	0.063 (0.53)	0.051 (0.44)
Cumulative capital inflows (% GDP)	0.046*** (5.13)	0.039*** (3.40)	0.042*** (3.50)
<b>Included instruments:</b>			
Log GDP per capita		-0.608 (1.43)	-0.687 (1.34)
English legal origin dummy		4.300** (2.30)	3.549* (1.87)
Domestic credit provided by banking banking sector (% GDP)		0.001 (0.06)	-0.002 (0.23)
Lending interest rate (%)		-0.140*** (2.73)	-0.131** (2.46)
Number of parent enterprises		0.001*** (3.53)	0.001*** (3.12)
Financial openness		-0.026 (1.37)	-0.027 (1.38)
Trade openness		0.013 (0.96)	0.010 (0.74)
Exchange rate stability		-0.136 (0.66)	-0.123 (0.60)
Dummy for banking crisis in previous year		0.105 (0.15)	0.118 (0.17)
Years under IMF programmes		0.004 (0.03)	0.034 (0.26)
Dummy for Asia		-5.564*** (3.21)	-6.254*** (2.95)
Dummy for Latin America			-3.577 (1.21)
Dummy for other emerging markets			-0.263 (0.06)
Constant	55.991 (36.18)	64.424 (12.29)	66.633 (11.34)
F-statistics for excluded instruments' p-value	47.10 0.000	15.67 0.001	15.75 0.001
Observations	451	451	451
Number of country ID	41	41	41
R <sup>2</sup>	0.073	0.203	0.225

Heteroskedasticity-consistent t-statistics in parentheses.

The symbols \*, \*\*, \*\*\* indicate significance level at 10%, 5%, and 1%, respectively.

A number of other variables do not appear to influence the quality of corporate governance significantly when included in the multivariate regression.<sup>21</sup> Interestingly, GDP per capita is among these variables, which indicates that characteristics that are very specific to the countries account for variations in the quality of corporate governance. Per capita GDP, which captures aspects of economic and institutional development not directly measured elsewhere, has no residual explanatory power.<sup>22</sup>

Other insignificant variables include domestic credit provided by the banking sector,<sup>23</sup> the incidence of recent banking crises,<sup>24</sup> the stability of the exchange rate, and the number of recent years in which the country was under an IMF programme.<sup>25</sup>

Another interesting result is the negative coefficient on the dummy variable for Asia. That is, after controlling for more than a dozen economic and political characteristics, the quality of corporate governance in Asia continues to lag behind that in other regions. Since the majority of non-Asian countries in the sample are advanced economies, this would appear to reflect the differential between Asia and that grouping.

In column 3 of the table we add dummy variables for Latin America and other emerging markets (South Africa and Turkey). In contrast to the dummy variable for Asia, these dummy variables are not significantly different from zero at standard confidence levels. This is telling us that, to the extent that corporate governance in Latin America is inferior to that in other regions, this is entirely explicable by observable characteristics of countries – their macroeconomic policies, the stability of their political systems, the influence of foreign investors, and so forth. It is not necessary to invoke, in addition, some special feature of the Latin American countries and their history not captured by the other independent variables.

In short, the quality of corporate governance varies across countries for both systematic and idiosyncratic reasons. Systematic reasons include the structure of the legal system and how effectively it empowers outside investors to lobby for information disclosure and representation; the presence of foreign investors, who are likely to lobby for improvements in corporate governance; and political stability and development, which influences the readiness of government to invest in governance reform. Additionally, in Asia, the dominance of bank finance and the number of parent enterprises appear to be negatively associated with the quality of corporate governance.

---

<sup>21</sup> However, Table 3 (the correlation matrix) shows that each of them has a statistically significant correlation with the measure of corporate governance quality.

<sup>22</sup> The adjusted  $R^2$  of this equation declines only from 0.203 to 0.200 when per capita GDP is omitted.

<sup>23</sup> This is included on the grounds that an active banking sector is sometimes seen as pushing for improved corporate governance.

<sup>24</sup> Banking crises may disrupt the process of market development, but they do provide additional impetus for reforms. Evidently, these effects cancel each other out.

<sup>25</sup> Any tendency for IMF tutelage to lead to improved corporate governance appears to be neutralised in the aggregate by cases of countries that were continuously under IMF programmes and in which transparency problems were rife. This variable is cumulative years under an IMF programme beginning in 1960. Its maximum value is 23 – representing Argentina, which was continuously under IMF programmes from 1983 through 2005. Similarly, although institutional strengthening, including better corporate governance, is sometimes seen as a prerequisite for moving to greater exchange rate flexibility – firms must then limit currency mismatches and other exchange rate-related balance sheet risks – this effect seems to be neutralised in the aggregate by the tendency for some countries with weak governance to exhibit relatively high levels of currency instability.

## 2.3 Effects

We now examine the impact of corporate governance quality on financial development. We treat corporate governance as endogenous, recognising that its quality can both be affected by and affect financial development.

We construct the fitted value of corporate governance using all the exogenous variables in the second stage as *included* instruments and the political variables and our measures of the presence of foreign investors as *excluded* instruments. We are not aware of previous arguments or evidence that the structure of the political system is important for financial development, which is why we are comfortable about omitting the political variables from the second stage and using them as instruments for corporate governance.<sup>26</sup> Omitting cumulative capital flows from the second stage is likely to be more controversial. However, dropping this variable from our list of instruments does not alter our key results, as we show below.<sup>27</sup>

In the second-stage regressions, we consider the impact of corporate governance, along with a vector of controls, on the capitalisation of private bond markets (as a percentage of GDP), government bond markets (as a percentage of GDP), stock market capitalisation (as a percentage of GDP), the number of listed companies, and the turnover ratio on the stock market (in per cent). The results are in Table 5. The key finding is that the exogenous component of corporate governance as we measure it has a positive effect on all these variables, but this effect is weakest in the case of public sector bond market capitalisation. This makes sense: stronger corporate governance works directly to make investment by outsiders in private corporations more attractive, but it will stimulate investment in public debt securities only indirectly, insofar as private and public bond markets are complements; that is, they use the same market infrastructure, have a similar customer base, and so on.<sup>28</sup>

When we estimate the same equations by pooled Ordinary Least Squares (OLS), ignoring the possibility of simultaneity, the significant positive effects on private bond market capitalisation, stock market capitalisation, the number of listed companies, and the measure of stock liquidity remain (see column 1 of Table 6). However, only the positive effect on private bond market capitalisation remains when we use fixed or random effects panel estimators without instrumental variables (see columns 2 and 3 of Table 6). This underscores the importance of recognising the endogeneity of corporate governance.<sup>29</sup>

---

<sup>26</sup> This is in contrast to work like that of Roe (2003), who argues that political variables should be significantly associated with corporate governance itself – this being precisely the argument relied on here.

<sup>27</sup> See the section below on robustness. On the other hand, dropping this variable does create some other sources of econometric discomfort, as we explain in that section, requiring us to modify the specification slightly.

<sup>28</sup> When we include private bond market capitalization as a determinant of public bond market capitalization, there is only weak evidence that a larger private market stimulates public bond market development. When we substitute public bond market size lagged one year in the first column, the key results do not change. In addition, lagged public bond market size is not significant (coefficient = -0.021, t-statistic = 0.66). Similarly, when we add private bond market capitalization lagged one year in the second column, the key results remain the same and the lagged private bond market size is not significant (coefficient = 0.044, t-statistic = 0.58).

<sup>29</sup> In the case of private bond markets, although the effect is positive and significant across all regression models, the fact that the coefficient on corporate governance quality in the OLS regressions is smaller than in the instrumental variable (IV) regressions suggests that the reverse relationship, from bond market size to corporate governance quality, may be negative.

Table 5  
**Effects of corporate governance quality**  
 Second stage, IV regressions

	Dependent variable:				
	Private bond market cap (% GDP)	Public bond market cap (% GDP)	Stock market cap (% of GDP)	Number of listed companies (in log)	Stock turnover ratio (%)
Corporate governance quality (fitted)	1.509*** (4.46)	0.366 (0.71)	12.215*** (4.33)	0.053*** (3.21)	3.826** (2.27)
Log GDP per capita	2.938*** (4.89)	-6.057*** (3.57)	14.117*** (4.25)	0.092** (2.33)	-3.123 (0.75)
English legal origin dummy	-5.454 (0.95)	-1.219 (0.13)	-27.908 (1.36)	0.788*** (2.61)	5.905 (0.31)
Domestic credit provided by banking sector (% GDP)	0.172*** (6.49)	-0.094*** (2.75)	-0.082 (1.37)	-0.001 (0.77)	0.128 (1.28)
Lending interest rate (%)	0.173*** (3.04)	-0.203* (1.74)	2.132*** (4.48)	0.010*** (3.21)	0.577 (1.46)
Number of parent enterprises	0.005** (2.48)	0.004** (2.25)	-0.008* (1.72)	0.001** (2.10)	0.008 (1.28)
Financial openness	-0.026 (0.75)	-0.134** (2.25)	1.006*** (3.11)	0.003** (2.22)	0.308** (2.34)
Trade openness	0.001 (0.02)	0.117*** (2.90)	0.483** (2.25)	0.000 (0.17)	-0.349*** (2.53)
Exchange rate stability	0.381** (2.33)	0.906*** (2.80)	3.800*** (4.46)	0.015** (2.01)	0.732 (0.56)
Dummy for banking crisis in previous year	0.978 (1.07)	0.418 (0.28)	-13.119*** (2.97)	0.017 (0.47)	-4.220 (0.46)
Years under IMF programmes	-0.164*** (2.69)	0.088 (0.54)	0.922* (1.86)	-0.011*** (3.58)	1.673 (1.19)
Dummy for Asia	-0.421 (0.07)	-23.452 (1.63)	61.071** (2.32)	1.001*** (3.62)	57.944** (1.96)
Public bond market size (% GDP)	0.038 (1.17)				
Constant	-122.943 (5.40)	64.088 (1.71)	-890.114 (4.55)	0.991 (0.86)	-167.657 (1.41)
Observations	439	439	451	451	451
Number of country ID	40	40	41	41	41
R <sup>2</sup>	0.656	0.011	0.472	0.313	0.227

Corporate governance quality is the fitted value from regressing the CGQ index on a set of instrumental variables as in column 2 of Table 4. Instruments used are: government stability, polity index and cumulative capital inflows as a percentage of GDP. Heteroskedasticity-consistent t-statistics in parentheses.

The symbols \*, \*\*, \*\*\* indicate significance level at 10%, 5%, and 1%, respectively.

Table 6

**Alternative specifications for the effects of corporate governance quality on financial development**

Dependent variable	Coefficient on corporate governance quality index				
	Pooled OLS	OLS/FE	GLS/RE	IV/FE	IV/RE
Private bond market cap (% GDP)	0.443*** (3.37)	0.188*** (3.12)	0.196*** (3.07)	1.393*** (3.71)	1.509*** (4.46)
Public bond market cap (% GDP)	0.143 (0.87)	0.100 (1.21)	0.126 (1.34)	-0.055 (0.10)	0.366 (0.71)
Stock market cap (% of GDP)	1.232*** (3.52)	0.065 (0.26)	0.259 (1.03)	11.940*** (3.60)	12.215*** (4.33)
Log number of listed companies	0.025*** (4.03)	-0.005** (2.17)	-0.003 (1.32)	0.025* (1.66)	0.053*** (3.21)
Stock turnover ratio (%)	0.438 (1.38)	0.232 (0.76)	0.281 (0.92)	9.028*** (2.89)	3.826** (2.27)

For the OLS and GLS models, each financial development variable is regressed on the CGQ index and the set of independent variables analogous to columns 1 through 5 in Table 5. For the IV models, first-stage regressions are analogous to column 2 of Table 4 (with English dummy origin, number of parent enterprises, and dummy for Asia dropped for the fixed effects IV regression). CGQ Index in the second-stage IV regressions is the fitted value from the first stage. Instruments used are: government stability, polity index and cumulative capital inflows as a percentage of GDP. Heteroskedasticity-consistent t-statistics in parentheses.

The symbols \*, \*\*, \*\*\* indicate significance level at 10%, 5%, and 1%, respectively.

## 2.4 Robustness

We performed a number of sensitivity analyses to check robustness. To start, we estimated alternative specifications for the first stage, as reported in columns 1 and 2 of Table 7. We dropped the insignificant exchange rate, banking crises, and IMF dummy variables. We then dropped the measures of financial openness, trade openness, and domestic credit provided by the banking sector. The key results carried over.

Second, we estimated our equations using fixed rather than random effects. This approach required dropping legal origin, the region dummies, and the number of parent enterprises because these variables do not vary over time. The first-stage results still hold for the other variables except that the coefficient trade openness now becomes positive and significant. The key results from the second stage are unchanged; the remaining coefficients all have the same sign and continue to differ significantly from zero at standard confidence levels.

Third, we dropped cumulative capital inflows from the first stage (column 3). We worried that the identifying power of this variable derives from the experience of a few outliers such as Hong Kong SAR. In addition, one might worry about the exclusion restriction: past capital flows may affect not just the quality of corporate governance but also the capitalisation and liquidity of financial markets directly. Reassuringly, our key results – in particular, the sign and significance level of the corporate governance variable in the second stage – remain the same.

Table 7

**Determinants of corporate governance quality robustness checks**

	Dependent variable: corporate governance quality (CGQ)			
	(1)	(2)	(3)	(4)
<b>Excluded instruments:</b>				
Government stability	0.132 (1.02)	0.127 (0.98)	0.268** (2.13)	0.124 (1.02)
Polity index	0.067 (0.55)	0.081 (0.68)	0.072 (0.60)	0.017 (0.15)
Cumulative capital inflows (% GDP)	0.039*** (3.38)	0.042*** (4.71)		
Average CGQ in other countries in the same region				0.373*** (4.59)
<b>Included instruments:</b>				
Log GDP per capita	-0.637 (1.56)	-0.580 (1.51)	-0.344 (0.94)	-0.087 (0.21)
English legal origin dummy	4.281** (2.39)	4.450*** (2.58)	5.084*** (3.05)	3.877** (2.34)
Domestic credit provided by banking sector (% GDP)	-0.128*** (3.01)	-0.130*** (3.09)	-0.136*** (3.19)	-0.085* (1.89)
Lending interest rate (%)	0.001*** (3.62)	0.001*** (3.78)	0.001*** (3.34)	0.001*** (2.71)
Number of parent enterprises	0.002 (0.24)			
Financial openness	-0.026 (1.35)			
Trade openness	0.012 (0.91)			
Dummy for Asia	-5.541*** (3.32)	-4.940*** (3.09)	-4.482*** (2.85)	-3.018* (1.83)
Dummy for Latin America				
Dummy for South Africa and Turkey				
Constant	63.188 (14.32)	63.307 (14.83)	61.437 (14.76)	37.583 (5.25)
F-statistic for excluded instruments'	15.79	30.43	4.92	22.73
p-value	0.001	0.000	0.085	0.000
Observations	451	451	451	451
Number of country ID	41	41	41	41
R <sup>2</sup>	0.206	0.215	0.234	0.271

All regressions are estimated using GLS random effects. Heteroskedasticity-consistent t-statistics in parentheses. The symbols \*, \*\*, \*\*\* indicate significance level at 10%, 5%, and 1%, respectively.

However, dropping this variable creates a problem of weak instruments.<sup>30</sup> The textbook treatment for this problem is to find more powerful instruments, which we could do by building on work on peer effects and policy diffusion (Simmons and Elkins 2003). Such work argues that the probability of a country's adopting a particular policy reform increases with the number of its neighbours who have already done so. One can argue that there is logic for including this latter variable – constructed, in the present context, as the quality of corporate governance in other countries in the same region – insofar as countries compete for foreign capital partly on the basis of how well they represent the interests of investors. This variable is plausibly exogenous except perhaps for countries large enough to influence the quality of corporate governance throughout the region. It is plausible to exclude it from the second stage, there being no reason to expect the quality of corporate governance elsewhere to have a first-order impact on the subject country's financial development. And it is a strong instrument. Adding it leaves the sign and significance of the key corporate governance variable in the second stage unchanged and eliminates the weak-instrument problem. A limitation of this variable is that it is not clear that a country's economic neighbours are also its geographic neighbours. This is why we relegate estimates using this instrument to this section on sensitivity analysis.

Fourth, we looked separately at the impact on market development of the individual components of our corporate governance index, having first estimated their determinants using the same specification as above. As Table 8 shows, all three elements (adoption of accounting standards, tendency not to smooth earnings, and share-price non-synchronicity) generally have the expected positive effect on private bond market capitalisation, stock market capitalisation, the number of listed companies, and the stock turnover ratio. This cumulative positive effect reassures us that the results do not hinge on the behaviour of any one component of our corporate governance measure.

Finally, we considered the number of listed companies scaled by real GDP and by total number of business registrations rather than simply the number of listed companies. We scaled by GDP to take into account the effect of country size and corporate sector size on this variable. For both specifications, the sign and significance of most variables, including corporate governance quality, remained unchanged, except for the log of real GDP per capita, the coefficient of which now became negative and significant.<sup>31</sup>

---

<sup>30</sup> The F-statistic for the excluded instruments is 15.67 with the measure of cumulative capital inflows included in the first stage and 1.33 without. The cutoff for weak instruments is a threshold of 10.00 as suggested by Staiger and Stock (1997) for the case of a single endogenous regressor.

<sup>31</sup> We include these specifications in this section on robustness rather than in the results section above because it is not clear that real GDP is an appropriate variable to use as a scaling factor for number of listed firms. Using the total number of business registrations as a scaling factor is more appropriate. However, doing so reduces the number of observations greatly (from 451 to 193 country-years) because of incomplete time-series data on this variable. In addition, since we already include the number of parent companies in the list of controls, we feel justified in entering the number of listed companies as a simple number. Data on total number of registrations are obtained from the World Bank Group Database on Entrepreneurship available online: <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:21164814~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html>.

Table 8  
**Effects of different components of CGQ index**  
 Second stage, IV regressions

Dependent variable:															
	Private bond market cap (% GDP)			Public bond market cap (% GDP)			Stock market cap (% GDP)			Number of listed companies (in log)			Stock turnover ratio (%)		
<b>CGQ Com- ponents:</b>															
Accounting standards (fitted)	3.161*** (3.82)			-1.328 (0.89)			19.071*** (3.48)			0.142*** (3.51)			49.230*** (5.21)		
Earnings smoothing (fitted)		0.912*** (4.60)			0.104 (0.33)			6.966*** (4.38)			0.033*** (3.39)			4.564*** (3.97)	
Price non- synchronicity (fitted)			0.819*** (4.02)			0.439 (1.44)			8.663*** (4.40)			0.027** (2.51)			-2.912 (1.45)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	453	439	475	453	439	475	465	451	489	466	451	490	465	451	489
Number of country ID	40	40	40	40	40	40	41	41	41	41	41	41	41	41	41
R <sup>2</sup>	0.655	0.657	0.658	0.005	0.010	0.013	0.452	0.471	0.476	0.281	0.312	0.296	0.221	0.226	0.230

All regressions are analogous to the full specification in Table 5 with the CGQ index replaced by each of its three components. Results on other independent variables omitted. Instruments used are: government stability, polity index and cumulative capital inflows as a percentage of GDP. Heteroskedasticity-consistent t-statistics in parentheses.

The symbols \*, \*\*, \*\*\* indicate significance level at 10%, 5%, and 1%, respectively.

### 3. Conclusion

Latin American countries have made significant progress in developing their capital markets. This progress occurs against the backdrop of increasing macroeconomic, financial and political stability. In reciprocal fashion, it contributes to the larger environment of stability.

At the same time, however, the size of corporate bond markets, the number of companies listing on equity markets, and market liquidity remain disappointing when compared to other regions. Markets that are still relatively narrow and illiquid may prove to be fragile and volatile in the event that the economic and financial environment sours – that is, if global growth slows and investor risk aversion increases. This fragility may in turn jeopardise the consolidation of the region’s newfound macroeconomic stability.

Accelerating progress in the development of Latin American capital markets is thus a matter of some urgency. Viewing capital market development as an organic part of the larger process of economic and financial development and waiting for the region’s economies to “grow up” is not enough. There are specific actions that governments and policymakers can take to foster the development of their capital markets. These actions include creating a more efficient market infrastructure – for example, instituting trading platforms or payment and settlement systems – and strengthening shareholder and bondholder rights, all of which we call the “plumbing” of capital markets. In this paper, we pay particular attention to one aspect of this plumbing – namely, corporate governance.

We find that improvements in corporate governance have been more prevalent in countries with stable governments prepared to pay the up-front costs of institutional reform, where there are foreign investors prepared to lobby for reform, and where other countries in the region are undertaking corporate governance reform. We find that the relevant reforms have a significant payoff in terms of the development of equity and corporate bond markets.

At the same time, comparison of emerging markets in Latin America and elsewhere with advanced economies suggests that the process is incomplete. One view of this situation is that effective corporate governance is an organic part of the larger process of economic and financial development and that countries can close their corporate governance quality gap only as their levels of economic and financial development converge with those of the advanced countries. Our results support a more optimistic conclusion. The quality of corporate governance depends on more than just per capita income as a measure of the general level of economic development – it depends also on a number of specific factors, suggesting that emerging markets can take specific actions to promote it. Macroeconomic stability is good for the development of corporate governance. Opening markets to foreign investment can be good for corporate governance. So too is political stability, which gives investors voice and governments an incentive to invest in the future.

Corporate governance quality does not simply reflect the level of financial development – it can also affect it. The results we discuss in this paper suggest that corporate governance can affect financial development in decidedly positive ways. We suspect that these conclusions are more general – that they carry over from corporate governance to other aspects of the “plumbing” of capital markets.

## Appendix

Table A1  
Description of variables and data sources

Variable	Description	Source
CGQ index	Unweighted average of the indicators of accounting standards, earning smoothing, and stock price synchronicity, ranging from 0 (worst) to 100 (best)	De Nicolo, Laeven, and Ueda (2006); updated by authors
Accounting standards index	Number of reported accounting items as a percentage of 40 accounting items	De Nicolo, Laeven, and Ueda (2006); updated by authors
Earning smoothing index	Rank correlation between cash flows and profits across a set of firms at each point in time, standardised, ranging from 0 (most opaque performance) to 100 (least opaque performance)	De Nicolo, Laeven, and Ueda (2006); updated by authors
Stock price synchronicity index	Average R-squared of regressions of each company's stock return on country-average return in each year, standardised, ranging from 0 (maximum synchronicity) to 100 (minimum synchronicity)	De Nicolo, Laeven, and Ueda (2006); updated by authors
Private bond market capitalisation	Private domestic debt securities issued by financial institutions and corporations (as a percentage of GDP)	BIS Domestic and International Securities Statistics <a href="http://www.bis.org/statistics/secstats.htm">http://www.bis.org/statistics/secstats.htm</a>  Supplementary data are from Beck, Demirgüç-Kunt, and Levine (2000) and national statistical databases.
Public bond market capitalisation	Public domestic debt securities issued by the government (as a percentage of GDP)	BIS Domestic and International Securities Statistics; supplementary data are from Beck, Demirgüç-Kunt, and Levine (2000) and national statistical databases.
Stock market capitalisation	Value of listed shares as a percentage of GDP	World Development Indicators (WDI)
Number of listed companies	Number of companies listed on the national stock market	World Development Indicators (WDI)
Stock turnover ratio	Ratio of total value of shares traded to stock market capitalisation	Beck, Demirgüç-Kunt, and Levine (2000)
Government stability	Assessment of the government's ability to carry out its declared programme(s) and its ability to stay in office, ranging from 0 (least stable) to 12 (most stable)	International Country Risk Guide (ICRG)

Table A1 (cont)

## Description of variables and data sources

Variable	Description	Source
Polity index	Combined scores of polity regime characteristics, ranging from -10 (strongly autocratic) to 10 (strongly democratic)	Center for International Development and Conflict Management (CIDCM), Polity IV Project < <a href="http://www.cidcm.umd.edu/polity">http://www.cidcm.umd.edu/polity</a> >
Cumulative capital inflows	Stock of inward foreign direct investment (as a percentage of GDP)	United Nations Conference on Trade and Development (UNCTAD) database: <a href="http://stats.unctad.org/fdi">http://stats.unctad.org/fdi</a>
Cumulative capital outflows	Stock of outward direct investment (as a percentage of GDP)	United Nations Conference on Trade and Development (UNCTAD) database: <a href="http://stats.unctad.org/fdi">http://stats.unctad.org/fdi</a>
Legal origin	Dummy variables indicating country law originated from English law, German law, French law, and Scandinavian law	La Porta et al (1998)
Log of real GDP per capita	Log of deflated GDP over total population	World Development Indicators (WDI)
Domestic credit by banking sector	Private domestic credit provided by deposit money banks and other financial institutions (as a percentage of GDP)	World Development Indicators (WDI)
Lending rate	Average lending rates paid by commercial banks (in percent)	World Development Indicators (WDI) and Global Financial Data (GFD)
Number of parent enterprises	Parent corporations are those enterprises that control assets of other entities outside their respective home countries. Typically, "control of assets" requires ownership of at least 10% of a corporation's shares or voting power (equity capital stake), or its equivalent for an unincorporated enterprise.	United Nations Conference on Trade and Development (UNCTAD). <i>World Investment Report 2005: Transnational Corporations and the Internationalisation of R&amp;D</i> Annex Table A.I.8. Available online at < <a href="http://www.unctad.org/en/docs/wir2005_en.pdf">http://www.unctad.org/en/docs/wir2005_en.pdf</a> >.
Financial openness	The sum of foreign direct investment and portfolio investment inflows and outflows (as a percentage of GDP)	Raw data from International Financial Statistics (IFS)
Trade openness	Total value of exports plus imports (as a percentage of GDP)	Raw data from World Development Indicators (WDI)
Exchange stability	Assessment of the appreciation or depreciation of a currency against the US dollar over a year, ranging from 0 (least stable) to 10 (most stable)	International Country Risk Guide (ICRG)

Table A1 (cont)

**Description of variables and data sources**

<b>Variable</b>	<b>Description</b>	<b>Source</b>
Years under IMF programme(s)	Cumulative number of years a country has been under IMF agreements	Vreeland (2003); updated data provided by James Vreeland
Currency crisis indicator	Dummy variable indicating an incidence of a currency crisis	Glick et al (2004) and Ranciere et al (2006)
Banking crisis indicator	Dummy variable indicating an incidence of a banking crisis	Caprio et al (2003) Banking Crises Database, World Bank < <a href="http://www1.worldbank.org/finance/html/database_sfd.html">http://www1.worldbank.org/finance/html/database_sfd.html</a> >. Updated banking crises data provided by Enrica Detragiache

## Appendix

Table A2  
**Sample countries**

Asia	Latin America	Europe	Other
China	Argentina	Austria	Australia
Hong Kong SAR	Brazil	Belgium	Canada
India	Chile	Denmark	New Zealand
Indonesia	Colombia	Finland	South Africa
Japan	Mexico	France	Turkey
Korea	Peru	Germany	United States
Malaysia	Venezuela	Greece	
Pakistan		Ireland	
Philippines		Israel	
Singapore		Italy	
Thailand		Netherlands	
		Norway	
		Portugal	
		Spain	
		Sweden	
		Switzerland	
		United Kingdom	

## References

- Alba, P, S Claessens and S Djankov (1998): Thailand's corporate financing and governance structures: impact on firms' competitiveness, unpublished manuscript, World Bank.
- Ananchotikul, S (2007): Does foreign investment really improve corporate governance? Evidence from Thailand, unpublished manuscript, University of California, Berkeley.
- Beck, T, A Demirgüç-Kunt and R Levine (2000): "A new database on financial development and structure", *World Bank Economic Review*, 14, pp 597–605.
- Bin Ibrahim, M and A Wong (2005): "The corporate bond market in Malaysia", *BIS Papers* no 26, pp 114–28.
- Bank for International Settlements (BIS): Domestic and international securities statistics, Table 16, <http://www.bis.org/statistics/secstats.htm>.
- Borensztein, E, B Eichengreen and U Panizza (2006): Building bond markets in Latin America, unpublished manuscript, Inter-American Development Bank and University of California, Berkeley, February.
- Braun, M and I Briones (2007): Development of the Chilean corporate bond market, unpublished manuscript, Universidad Adolfo Ibañez, January.
- Capaul, M (2003): Corporate governance in Latin America, unpublished manuscript, Latin America and the Caribbean Region, World Bank.
- Caprio, G, D Klingebiel, L Laeven and G Noguera (2003): "Banking Crisis Database", World Bank, [http://www1.worldbank.org/finance/html/database\\_sfd.html](http://www1.worldbank.org/finance/html/database_sfd.html).
- Center for International Development and Conflict Management (CIDCM): Polity IV Project, Political regime characteristics and transitions, 1800–2004, University of Maryland, <http://www.cidcm.umd.edu/polity>.
- Cheung, S and H Jang (2005): "Evaluation of corporate governance in East Asian economies", PECC Macro Corporate Governance Scorecard Project, Seoul, PECC.
- Chong, A and F Lopez-de-Silanes (2007): Corporate governance in Latin America, Working Paper no 591, Washington, D.C.: Inter-American Development Bank.
- De la Torre, A, J Gozzi and S Schmukler (2007): Capital market development: whither Latin America?, unpublished manuscript, World Bank.
- De Nicolo, G, L Laeven and K Ueda (2005): "Corporate governance quality: trends and real effects", IMF Working Paper no WP/06/293, December.
- Doidge, C, G Karolyi and R Stulz (2004): "Why do countries matter so much for corporate governance?", Finance Working Paper no 50/2004, European Corporate Governance Institute, September.
- Eichengreen, B, E Borensztein and U Panizza (2006): "A tale of two markets: bond market development in East Asia and Latin America," Hong Kong Institute for Monetary Research Occasional Paper 3, October.
- and P Leungnaruemitchai (2006): "Why doesn't Asia have bigger bond markets?", *BIS Papers* no 30, Basel: BIS.
- Enriques, L and P Volpin (2007): "Corporate governance reforms in Continental Europe", *Journal of Economic Perspectives* 21, pp 117–40.
- Espenila, N (2005): "The corporate bond market in the Philippines", *BIS Papers* no 26, pp 135–45.
- Glick, R, X Guo and M Hutchison (2006): "Currency crises, capital-account liberalisation, and selection bias", *Review of Economics and Statistics*, no 88, pp 698–714.

- Goldstein, M (1998): *The Asian Financial Crisis*, Washington, D.C.: Institute for International Economics.
- Hofstetter, K (2005): *One size does not fit all: corporate governance for “controlled companies”*, unpublished manuscript, Harvard Law School, June.
- International Country Risk Guide (ICPR) (2006), Political risk services, The PRS Group.
- International Monetary Fund (IMF) (2005): “Development of corporate bond markets in emerging market economies”, *Global Financial Stability Report*, [www.imf.org](http://www.imf.org).
- Johnson, S, R La Porta, F Lopez-de-Silanes and A Shleifer (2000): “Tunneling”, *American Economic Association Papers and Proceedings*, no 90, pp 22–7.
- Kahn, H (2003): *Corporate governance of family-based businesses in Asia: which road to take?*, unpublished manuscript, University of Denver.
- La Porta, R, F Lopez-de-Silanes, A Shleifer and R Vishny (1998): “Law and finance”, *Journal of Political Economy*, no 106, pp 1113–55.
- McCauley, R (2003): “Unifying government bond markets in East Asia”, *BIS Quarterly Review*, December, pp 89–98.
- Morck, R, B Yeung and W Yu (2000): “The information content of stock markets: why do emerging markets have synchronous price movements?”, *Journal of Financial Economics*, no 58, pp 215–60.
- Ranciere R, A Tornell and F Westermann (2006): “Decomposing the effects of financial liberalisation: crises vs. growth”, *NBER Working Papers* no 12806, December.
- Roe, M (2003): “Political determinants of corporate governance: political context, corporate impact”, *Discussion Paper* no 451, John M. Olin Center for Law, Economics, and Business, Harvard Law School, December.
- Simmons, B and Z Elkins (2003): “Globalisation and policy diffusion: explaining three decades of liberalisation”, in M. Kahler and D. Lake (eds), *Governance in a Global Economy*, Princeton: Princeton University Press, pp 275–304.
- Staiger, D and J Stock (1997): “Instrumental variables regression with weak instruments”, *Econometrica*, no 65, pp 557–86.
- Tovar, C and S Jeanneau (2007): *Latin America’s local currency bond markets: an overview*, unpublished manuscript, BIS.
- United Nations Conference on Trade and Development (UNCTAD): *World Investment Report 2005: Transnational Corporations and the Internationalisation of R&D*, Annex Table A.I.8, [http://www.unctad.org/en/docs/wir2005\\_en.pdf](http://www.unctad.org/en/docs/wir2005_en.pdf).
- *Foreign Direct Investment Database*, <http://stats.unctad.org/fdi>.
- Vreeland, J (2003): *The IMF and Economic Development*, New York: Cambridge University Press.
- World Bank (WB) (1998): *East Asia: The Road to Recovery*, Washington, D.C.
- Zettelmeyer, J (2006): “Growth and reforms in Latin America: a survey of facts and arguments”, *IMF Working Paper* WP/06/210.

# Domestic securities markets and monetary policy in Latin America: overview and implications<sup>1</sup>

Serge Jeanneau<sup>2</sup> and Camilo E Tovar<sup>3</sup>

## 1. Introduction

During the last decade, Latin American economies have transformed their monetary policy arrangements. Most countries in the region have given their monetary authorities more independence and/or developed policy frameworks that put greater emphasis on controlling inflation. Furthermore, monetary operations have shifted towards market-based frameworks. These arrangements should in principle be better and more efficient than previous ways of conducting monetary policy. However, their effectiveness depends to a large extent on the existence of developed financial systems that offer monetary authorities the choice of markets in which to operate and guarantee that actions in short-term markets will spread effectively to other market segments. The development of domestic securities markets and, more generally, the range of issues affected by the ongoing changes in the financial system not only have helped complete markets, but have also modified the impact and the extent of monetary control. In particular, such changes are likely to have altered the transmission mechanism of monetary policy. However, whether new financial developments have strengthened or weakened the impact of policy measures is open to debate.

Although financial developments may have important implications for monetary policy, there is also a question about the role that central banks should play, if any, in fostering the development of domestic financial markets. This is not a moot point given that central banks need to coordinate policies with finance ministries. In fact, there are good reasons to believe that the extent of financial market deepening will depend on strategies for developing primary and secondary securities markets (Sundararajan and Dattels (1997)).

This chapter discusses some of the issues linking the development of Latin American securities markets and monetary policy. In particular, a key aspect is how securities markets affect the effectiveness of monetary policy. Whenever possible, the chapter cites relevant evidence for the region but does not provide an exhaustive analysis of this complex topic.

The next section offers a brief overview of how the transformation of financial markets may have affected key transmission mechanisms. The following section discusses the role of central banks in developing domestic securities markets. This discussion highlights the need for coordinating public debt management between central banks and treasuries. A final section concludes.

---

<sup>1</sup> The views expressed are those of the authors and do not necessarily reflect those of the BIS. We thank Michela Scatigna, Ramón Moreno and Philip Turner for their comments, Rodrigo Mora for research assistance and Alejandra Gonzalez for editorial support.

<sup>2</sup> Bank for International Settlements, serge.jeanneau@bis.org.

<sup>3</sup> Bank for International Settlements, camilo.tovar@bis.org.

## 2. The transmission mechanism of monetary policy<sup>4</sup>

The transformation of the financial sector has affected the transmission mechanism of monetary policy. In particular, the development of securities markets and the entry of non-bank financial intermediaries have brought changes to central banks' operating procedures.<sup>5</sup> These shifts are also likely to have changed how instruments directly under the central bank's control (eg short-term interest rates or reserve requirements) affect the financial conditions of corporations and households. Overall, this transformation may have modified the link between financial conditions and the spending decisions of economic agents, thus affecting the transmission mechanism.

The changes just discussed have come about in part because bank intermediation has become less dominant as financial markets have developed. This shift is reflected in households that place their savings outside the banking sector, enterprises that rely on non-bank sources of financing and banks that are exploring new markets. Also, the setting of commercial bank rates appears to have become more responsive to financial market conditions, and privatisation and the subsequent reduced presence of state-owned banks have influenced the transmission mechanism.

This section focuses on how the monetary transmission channels identified in the literature may have changed during the last decade.<sup>6</sup> We start with a general overview of the evidence, then look in more detail at the evidence for some specific channels. The main arguments here are that the development of domestic securities markets together with the adoption of new operating procedures have affected:

- (i) the interest rate channel, by affecting the pass-through of policy rates to market rates.
- (ii) the exchange rate channel, by reducing the vulnerabilities associated with currency mismatches.
- (iii) the credit channel, by reducing the funding availability response to changes in policy rates or shocks.
- (iv) the expectation channel, which has probably become more important as developed financial markets rely more on expectations about future policy decisions.

### 2.1 Evidence of structural changes in the transmission mechanism

The empirical evidence confirms that a change in the transmission mechanism has taken place in some Latin American economies in recent years. For instance, evidence for Mexico suggests a major structural break in transmission associated with the introduction of the inflation-targeting regime (IT) in 2001 (Gaytán and Gonzalez (2006)). In particular, there appears to be a stronger response of the real exchange rate and inflation to movements in

---

<sup>4</sup> A more general discussion of the transmission mechanism in emerging market economies is found in Kamin et al (1998).

<sup>5</sup> The article also includes an appendix reviewing the transformation of central bank operating procedures in the region. In particular, it argues that the choice of operating procedures determines the extent to which monetary policy relies on financial markets to exercise monetary control.

<sup>6</sup> For a more general treatment of the transmission mechanism, see Mishkin (1995), Kamin et al (1998), Loayza and Schmidt-Hebbel (2002), Agénor (2004) and Archer (2006).

the interest rate. Although IT is identified as the main driver for the change in transmission,<sup>7</sup> it seems difficult to isolate this factor from the development of domestic securities markets or from the strengthening in bank intermediation. In fact, as discussed in the accompanying article in this volume, “Latin America’s local currency bond market and overview”, the Mexican government began in 2000 to follow a clearly defined public debt management strategy aimed at developing the longer-term fixed-rate debt market. The result has been an impressive growth in this market segment. In the banking sector, there has also been a gradual but sustained increase in credit to new market segments.

Evidence for other countries in the region also points to a structural break that has improved the transmission mechanism. However, each country has its own reasons for the break, and they are not necessarily related to the development of the financial system. In Chile, changes in the transmission mechanism appear to have been driven by a combination of such factors as improved macroeconomic policies, increased financial and trade openness, a more stable external environment and a deepening of the financial system (Betancour et al (2006)). In Colombia, the decline of inflation, the adoption of IT and the financial crises of the late 1990s and early 2000s were all instrumental in the changing transmission of monetary policy (Vargas (2007)).

While some studies have emphasised how the adoption of new policy frameworks has been associated with changes in the transmission mechanism, they have focused less on the immediate and lagged effects of financial crises. In Argentina, the Dominican Republic<sup>8</sup> and Uruguay, for example, banking crises disabled the transmission mechanism. These crises weakened the balance sheet positions of households and firms, which reduced the interest rate elasticity of credit supply and demand and prevented an expansionary monetary policy from inducing greater bank lending.<sup>9</sup>

## 2.2 The interest rate channel: impact on the interest rate pass-through

Available evidence suggests that the impact of monetary policy on short-term interest rates has strengthened over time, but with differentiated effects across countries. In particular, it seems that the interest rate channel is likely to be less relevant in the smaller economies of the region than in the larger ones, which tend to be financially more advanced.<sup>10</sup>

Quicker and stronger pass-through of policy rates to commercial bank rates appears to be the norm in Colombia nowadays (Amaya (2006)).<sup>11</sup> In Peru, interest rate pass-through

---

<sup>7</sup> An advantage of IT is that it induces a stronger response to inflation expectations. Therefore, an IT framework that reduces the volatility of inflation expectations will require a smoother response on the part of the central bank, thus indirectly reducing the volatility of the exchange rate.

<sup>8</sup> In fact, for the Central Bank of the Dominican Republic, the 2003–2004 banking crisis prompted changes in operating procedures for monetary policy, which in turn had an impact on the transmission mechanism. In particular, overnight rate and Lombard facilities were introduced. The latter had the goal of building a corridor of interest rates oriented towards signalling the stance of monetary policy.

<sup>9</sup> Balance sheet positions have also encouraged a shift of resources into government debt in some countries, as occurred in Brazil, Colombia and Mexico, among others. In Colombia, this shift into government debt may explain the large exposure of banks to government paper, which has created financial instability *ex post* (Vargas (2006)). Betancour et al (2006) also offer an interesting discussion of how the behaviour of policy and market rates differed in recent periods of stress.

<sup>10</sup> See Tovar (2007) for evidence in this direction.

<sup>11</sup> This study reports an average pass-through coefficient of 0.75 for CDs, taking an average of 6.1 months for the maximum response to take place. The average pass-through for the credit market is 0.76 on average, taking 4.4 months for the maximum response to take place. However, this study does not evaluate how policy interest rate changes are transmitted to consumption and investment decisions. Vargas (2007) does so and

continues to be incomplete but has improved with the adoption of IT as well as with the adoption of the policy rate as an operational instrument. There is also evidence that the introduction of an interest rate band has allowed a faster adjustment of interbank interest rates (Lahura (2006)).<sup>12</sup> The evidence suggests a strengthening of this channel in recent years in Mexico as well, as captured by the impact of the nominal interest rate on the real exchange rate and a modified trajectory of inflation (Gaytán and Gonzalez (2006)).

In Chile, the evidence shows a pass-through from the overnight rate to market rates similar to those in advanced economies (eg the United States or Canada).<sup>13</sup> Interestingly, there appears to be no evidence of differences in interest rate pass-through among nominal or inflation-indexed instruments, and no evidence of asymmetric pass-through (Espinosa-Vega and Rebucci (2004)). However, in contrast to other countries, Chile seems not to have changed in response to amendments to the exchange rate and monetary policy regimes in September 1999 and June 2001.

In Argentina, the central bank had to rebuild the instruments and channels of monetary policy, not just because of the disruption created by the currency and financial crises but also because the focus of policy in the previous decade had been different. The central bank has relied on the development of central bank notes and bonds (LEBACs and NOBACs). Those instruments were initially intended to compensate for the expansionary effects of financing to banks during the crisis but are now employed to compensate for the expansionary effects of a precautionary policy of reserve accumulation. The central bank has also started active intervention in the repurchase market to increase the response of the interbank market, which shows signs of segmentation. This process has allowed the central bank to extend the maturity of its debt, which in principle should also help the central bank to influence longer-term rates (Pesce (2006)).

A related issue is whether greater openness and liberalisation of the financial system has strengthened the interest transmission mechanism. Some evidence for emerging market economies (EMEs) suggests that foreign long-term interest rates have a larger impact on domestic long-term rates than on the domestic policy rate (Moreno (2007)). This finding would imply that liberalisation does not automatically translate into more powerful interest rate transmission in EMEs. Some evidence for Asian economies indicates that the pass-through of money market rates to commercial lending rates did not significantly increase between 1990–94 and 2000–04. Although the explanation for this is not straightforward, one possibility is that increased capital mobility might have limited pass-through by strengthening the international convergence of long-term interest rates (Archer (2006)). Another possibility is that unhealthy financial systems might have kept pass-through from rising. For instance, good loans might be crowded out in countries where accounting practices allow bad loans to be hidden, therefore limiting the stimulatory effect of lower interest rates. Finally, another possibility is that unhealthy banks do not lend to the private sector, instead investing most of their funds in government securities.

---

finds that the debt build-up observed in Colombia during the 1990s increased the sensitivity of aggregate demand to interest rates. This appears to have been most relevant during the 1999 recession.

<sup>12</sup> This study finds that (i) interest rate pass-through increased from 0.5 on average before IT to 1.2 later; (ii) the speed of adjustment to long-run levels increased for all interest rates; and (iii) the average lending rate adjustment for negative interest rate deviations from its equilibrium declined from 6 to 3 months, and from 9 to 4 months when the deviation was positive.

<sup>13</sup> Their estimates indicate that in Chile the degree of pass-through upon impact is 0.63 and 0.18 for the short-term and medium-term nominal lending rates, which implies an average pass-through of 0.61. For deposit rates, the respective numbers for the short and medium term are 0.68 and 0.20. As for inflation-indexed rates, the pass-through is 0.31 (0.21) and 0.31 (0.19) for short-term (long-term) lending and deposit rates, respectively.

## Box 1

### **Structural change in the banking sector and the interest rate channel**

Specific structural changes in the banking sector, such as deregulation or consolidation, can also affect the interest rate channel. Although deregulation can take many forms, it is possible to illustrate its overall impact by considering the effect of a removal of interest rate ceilings on deposits. In economies with some development of financial markets, such a measure would strengthen the role of interest rates in allocating credit. The evidence for advanced economies such as the United States supports such an evolution (Sellon (2002)). However, the impact of deregulation in emerging or developing countries has not been studied.

Equally relevant is how much the trend towards bank consolidation has affected the transmission mechanism. On the one hand, domination of the banking market by a few large banks could have reduced the degree of competition, potentially weakening the pass-through of policy rates to commercial bank rates. On the other hand, bank consolidation may have increased the effectiveness and speed of the interest rate channel if it improved market efficiency and reduced transaction costs. However, it is also possible that consolidation reduced the access of small borrowers to the credit market and made them more dependent on small local banks, amplifying the credit channel. Given the early stage of financial market development in the region, it is likely that efficiency aspects have dominated other factors, increasing the overall effectiveness of monetary policy.

A special G10 report (2001) argues that market concentration could affect the interest rate transmission channel in conflicting ways. On the one hand, it might lead to more variable margins between borrowing and lending rates, and reduce the lag in the transmission mechanism if bigger firms process information faster. On the other hand, it could increase the lag if bigger firms are able to exploit customer inertia when official rates change. Unfortunately, the evidence on the relevance of pass-through is scarce and inconclusive, even for advanced economies. This is not surprising given that in practice many factors affect the pass-through of policy to market rates, such as the introduction of new technologies by financial intermediaries, the development of new financial instruments, the reduced barriers to entry in some financial markets and the greater integration of capital markets across countries.<sup>1</sup> Therefore, even if consolidation were to affect the interest rate channel, central banks would have to adjust their policy settings over time in response to the observed modifications in pass-through, without necessarily needing to identify the precise reasons for those changes.

---

<sup>1</sup> Exchange rate pass-through is also likely to be influenced by the manner in which banks react to different shocks and to the state of the economy. Betancourt et al (2006) highlight the relevance of considering the behaviour of perfectly competitive banks under alternative economic conditions. They assess this for Colombia using VARX estimations and simulations of a small open economy model. They show that in the event of an external shock associated with an increase in international interest rates, the response of policy rates is much lower than that of market rates. They take this as evidence that to keep inflation on target, the response of policy rates need not be as large as the required reaction in deposit rates.

### **2.3 The exchange rate channel: reducing balance sheet vulnerabilities**

The exchange rate can play a significant role in the transmission mechanism of monetary policy if authorities keep in mind considerations affecting a country's financial stability. Countries with a high degree of financial dollarisation could be highly vulnerable to the impact of currency devaluations on firms' and banks' balance sheets. For instance, if firms' debts are denominated in foreign currency while their revenues are denominated in local currency, a devaluation could result in a deterioration of their net worth. This in turn would impose restrictions on firms' ability to roll over their debts, which could then reduce investment. On the other hand, there could also be a magnification effect associated with the impact of currency devaluations on firms' balance sheets. In particular, the deterioration of their financial position could increase the cost of new financing.

In general, it is possible that by addressing the problem of currency mismatches, the development of local currency bond markets has actually weakened the impact of exchange rate fluctuation on firms' balance sheets (see complementary evidence in the chapter "Financial stability implications of local currency bond markets: an overview of the risks").

## **2.4 The credit channel: sustaining credit in periods of stress**

Economists have great difficulty in explaining quantitatively the role of monetary policy through interest-sensitive components of aggregate spending (Bernanke and Gertler (1995)). For this reason, the literature has emphasised the role of asymmetric information and costly enforcement of contracts. In such frameworks, the credit channel is effectively an enhancement mechanism, in the sense that it amplifies endogenous changes in the external finance premium. The key issue here is whether changes in the policy rate affect the external finance premium or not. If they do, then monetary policy would not only have a direct effect via the cost of borrowing but also an indirect one through the external premium that might lead to credit rationing. Therefore, rather than emphasising the impact of monetary policy on the price of credit, this channel highlights the effects on the quantity or availability of credit. Two basic channels of monetary transmission have been emphasised within the credit channel: the bank lending channel and the balance sheet channel. The first one focuses on the effect of monetary policy on the supply of loans, while the second emphasises the impact of monetary policy on a borrower's net worth, cash flow and liquid assets. In this section, we look at some of the issues and the (scarce) evidence available concerning the credit channel.

It follows from the previous discussion that monetary policy is likely to have a stronger impact if it affects the supply of credit as well as interest rates. In principle, it is unclear whether the development of the financial sector has strengthened or weakened the credit channel (Archer (2006)). On the one hand, it may have strengthened it because more developed and stronger financial entities can increase credit to households and firms. On the other hand, it may have weakened it as a result of economic agents gaining access to more liquid and deeper securities markets, both onshore and offshore. In addition, financial development may have weakened the credit channel if bank access to the interbank market has improved. Banks with limited access to this market (because of actual or perceived weakness in their balance sheets) are forced to rely on the central bank for liquidity. These banks are likely to be very sensitive to changes in interest rates. Although empirical evidence supporting the existence of a credit channel is limited, some studies suggest that such a channel might be particularly relevant for EMEs that have less developed financial markets or that are subject to direct credit controls.<sup>14</sup>

---

<sup>14</sup> Identifying the credit channel is complicated in practice because it is not easy to distinguish between tight credit conditions arising from a decline in liquid bank reserves and those arising from a deterioration in the creditworthiness of potential borrowers.

## Box 2

### Dollarisation and the transmission mechanism

Dollarisation can affect both the way in which monetary policy is conducted and the transmission mechanism. The *conduct of monetary policy* can change with dollarisation for several reasons. First, dollarisation can affect the choice of assets included in monetary aggregates. Second, it can increase the sensitivity of monetary aggregates to sudden shifts in interest and exchange rates (especially if dollarisation reflects a high degree of currency substitution). Third, it can increase the volatility of money demand as a result of the lower costs of switching to foreign currency.

The *transmission mechanism* can be modified by dollarisation in at least two dimensions (Leiderman et al (2006)). First, the exchange rate is expected to play a more important role than in non-dollarised economies due to a higher and possibly non-linear exchange rate pass-through, as well as increased volatility under flexible regimes due to an increased sensitivity of monetary aggregates to interest and exchange rates. Second, balance sheet effects might have the potential to induce contractionary devaluations, which in turn can create financial stress. For these reasons, there is an incentive for central banks to intervene in the foreign exchange market under certain circumstances to mitigate exchange rate fluctuations. In this respect, it can be argued that dollarisation also affects the choice of exchange rate regime.

*Is the transmission mechanism different in dollarised economies than it is in non-dollarised economies?* Some have pointed to the lower exchange rate pass-through in Chile than in Peru as evidence (Leiderman et al (2006)). In Peru there is a causal relationship (in the Granger sense) between non-performing loans and the nominal exchange rate, but such a relationship cannot be established for Chile. This discrepancy is taken as evidence of balance sheet vulnerabilities in dollarised economies. Equally important is whether there are asymmetric and non-linear effects of transmission in highly dollarised economies. In this respect, the evidence suggests that dollarisation does not distort the curvature of the aggregate supply curve. In particular, the evidence suggests that monetary shocks at different stages of the economic cycle have qualitative effects in Peru similar to those in non-dollarised neighbouring economies – that is, a larger impact on output and a smaller one on inflation in periods of low growth and vice versa (Bigio and Salas (2006)). However, an analysis of the impact of real exchange rate shocks indicates that contractionary devaluations may occur in the short run, particularly in the lower part of the cycle.

*Dollarisation and inflation targeting.* A number of highly dollarised countries in the region have shown interest in implementing IT regimes (eg Bolivia, Paraguay and Uruguay). However, meeting the conditions can be difficult in practice. Peru's is the only highly dollarised economy with a fully fledged inflation targeting scheme. Under these conditions, monetary policy requires a special design and implementation (Armas and Grippa (2006)). First, the inflation target must be low (Peru's is currently at 2% +/- 1%, the lowest in Latin America) so that the currency is able to compete with the dollar as a unit of account and means of payment. Second, forecast models must carefully consider the risks of financial dollarisation. Consequently, it is necessary to implement de-dollarisation policies, internalise the risks of financial dollarisation and limit the vulnerability of the financial system.

Overall, the Peruvian experience appears to confirm that, with appropriate policy implementation, dollarisation should not impair the effectiveness of monetary policy in achieving low and stable inflation. Another interesting lesson is that shifting from a monetary aggregate to an interbank interest rate can help to establish a more predictable and transparent monetary policy and favour the issuance of long-term financial instruments, thus helping to reduce financial dollarisation.

Finally, it is important for dollarised countries to determine the transitional impact of switching to IT. Evidence is limited. The Peruvian case shows that in most recent years, as the economy switched to IT, the inflation response to interest rates increased, but the response to the nominal exchange rate decreased (Leiderman et al (2006)).

Two studies provide mixed evidence on the relevance of the lending channel for the region. The first one finds weak support for the existence of supply side effects in credit markets for EMEs. In particular, the study relies on structural changes in the banking sector in EMEs (including Latin America) and shows that loan and deposit growth are highly sensitive to economic activity in a way that does not differ significantly across domestic and foreign

banks (Arena et al (2006)). The other, which looks at Chile, shows that less liquid banks are forced to curtail the supply of credit following a monetary policy shock, so that the access of households and small and medium-sized enterprises to external financing is severely restricted following a drop in the supply of bank credit. Furthermore, this decline in bank credit is unevenly distributed due to flight-to-quality effects, and thus has a major impact on macroeconomic activity (Alfaro et al (2004)).

## 2.5 The expectations channel: increasing the sensibility to future developments

Market expectations about the future stance of monetary policy and, more generally, about forward-looking financial variables constitute another channel for the transmission of monetary policy, one that has possibly become more complex with the changes in financial systems and in central banks' operating procedures. The development of government securities markets allows for a better extrapolation of implied expectations. To the extent that pricing information improves, central banks and market participants will be able to employ such measures in a more efficient manner. This in turn can reduce the volatility of the markets and provide a stronger role for the expectations channel.

Historically, central banks have been somewhat cautious in providing information about monetary policy to financial markets. However, in recent years there has been a marked change as it appears that providing more information might actually help central banks to achieve their goals and improve policy effectiveness. In this regard, a notable improvement in the region (and worldwide) has been the trend towards greater transparency. In practice, the role of expectations has become so fundamental in some countries that what a central bank says about its goals and its economic outlook might be as significant, or even more significant, than what it does.<sup>15</sup> Furthermore, changes in expectations can magnify the transmission channels discussed earlier, depending on the degree of credibility of the policy change and its perceived duration (Agénor (2004)). Credibility can also be so well established that a temporary interest rate hike might have no effect on private sector behaviour or on the real economy if agents expect monetary authorities to reverse their course of action. In contrast, a policy change can be magnified if the policy decision is completely credible. In such a case, an interest rate hike that reduces investment and consumption over time might instead have an immediate effect, eg as in lower wage demands in current labour contracts (Céspedes and Soto (2005)).

The shift to IT in some Latin American economies has given greater prominence to the management of inflationary expectations. Such a regime is expected to anchor inflation around the inflation target. Therefore, two issues emerge: first, whether inflationary expectations are indeed well anchored around the target and, second, whether IT achieves such a result. Regarding the first, evidence shows that in some of the larger economies of the region (eg Brazil, Chile and Mexico), inflation expectations 12 months out have recently displayed lower variability than contemporary 12-month inflation, and have been close to their target levels (BIS (2006)). Furthermore, in most of the largest countries, inflationary

---

<sup>15</sup> The role of expectations is of great importance in the new theoretical frameworks. These frameworks (Clarida et al (1999)) build simple macroeconomic models from which new IS and Phillips curves are derived. The new IS curve differs from its old counterpart in that current output depends on expected future output and real interest rates. As a result, higher expected output raises current output. In particular, since individuals prefer to smooth consumption, the expectation of higher consumption in the next period leads them to want to consume more today, which raises current demand. In turn, the negative effect of the interest rate reflects intertemporal substitution of consumption. In this framework, the output gap also depends on the expected future path of demand shocks. The new Phillips curve in turn depends on, among other things, expected inflation. In contrast to the old Phillips curve, however, what matters is future expected inflation rather than the expected current inflation. Consequently, inflation can be shown to depend on current and future economic conditions – that is, firms set nominal prices based on the expectations of marginal costs and cost push shocks.

expectations have moved within the central bank's target range for some years now. For instance, 12-month inflation expectations in Chile have moved around the target of 3% since they were first announced in 2002. In Brazil, inflationary expectations have remained below the upper band of the inflation corridor set by the central bank since 2003. However, it is difficult to assess more formally how well anchored inflation expectations are given their endogeneity. Also the worldwide trend to lower inflation complicates the identification of the role of IT. Finally, the size, persistence and frequency of shocks are usually of a greater magnitude in EMEs. Despite these difficulties, Capistrán and Ramos-Francia (2006) offer empirical evidence contrasting the experience of five countries in the region that have implemented IT (Brazil, Chile, Colombia, Mexico and Peru) with two countries that have not (Argentina and Venezuela) along with eight non-targeting industrial countries (France, Germany, Italy, Japan, the Netherlands, Spain, Switzerland and the United States). In particular, they quantify the dispersion of inflation expectations<sup>16</sup> using data from surveys of private forecasts as well as from interest rate differentials. They find that the dispersion of inflation expectation is lower under IT regimes than non-IT ones.

The anchoring of inflationary expectations observed in recent years in the larger economies of the region thus appears to have increased the credibility of monetary policy, which has consequently allowed authorities to set more forward-looking policies. With increased alignment of inflation expectations with actual inflation, price-setting behaviour has also changed. Indeed, evidence for Chile shows that costly price adjustments are carried out less frequently and inflation indexation has decreased (Céspedes and Soto (2005)).

### **3. Fostering domestic financial markets: policies and policy coordination**

To what extent should policymakers and, in particular, central banks foster the development of financial markets? And what role should central banks play in them? There is no consensus on this issue, and many EMEs are still struggling to find the appropriate balance. One view is that monetary policy instruments and procedures should accommodate themselves to the level of development of financial markets, even if such markets are little developed. An alternative view is that central banks should be ready to set the pace of financial development.

Evidence suggests that waiting for institutions to evolve before adopting market-based mechanisms might be a less successful strategy than promoting that evolution by adopting such mechanisms as part of a modernisation programme (Archer (2006)). In either case, a long period of transition in which market-oriented instruments coexist with quantitative controls is frequently necessary. The sequencing and speed of this transition need to be carefully assessed so that policymakers have enough time to learn about the new environment and financial institutions are better able to cope with greater interest rate volatility.<sup>17</sup> Furthermore, policymakers must recognise that the inherited institutional structure

---

<sup>16</sup> This is defined by the coefficient of variation as measured by the ratio of the inter-quintile range and the median.

<sup>17</sup> The International Monetary Fund (IMF) (2004) identifies four stages in the development of money markets: (i) re-establishing key functions in post-conflict countries in areas where a central bank has responsibilities; (ii) developing financial intermediation where monetary policies rely on rules-based instruments (eg reserve requirements or deposit or refinance facilities available to the banks on demand); (iii) fostering inter-bank market development through the introduction of money market operations, while retaining rules-based instruments; and (iv) diversifying markets so that liquidity management can start to rely fully on money markets.

might not be appropriate for a market-driven environment. This has happened when, for instance, state-owned banks have continued to play a significant role or if savings have continued to be channelled through national savings institutions.

### 3.1 What can central banks and treasuries do?

One of the main challenges in developing bond domestic markets is in promoting their liquidity. Two fundamental prerequisites for achieving this liquidity are good economic policies and governance. In particular, both domestic and foreign residents will have the confidence to participate actively in a country's domestic bond market if a number of conditions are met, such as a sustainable overall fiscal position, a well-designed and efficient tax system, well-controlled government expenditures directed at achieving policy objectives that are widely accepted, and an accountable and independent central bank with a clear goal of maintaining price stability. Furthermore, it is necessary that these policies foster confidence in the authorities' commitment to maintain full convertibility of the currency. Governance also matters to the extent that these markets require clear rules regarding the legal system, and these rules must ensure that property rights are clearly defined.

Beyond these well-known elements, there are more practical policy areas that can foster the liquidity of domestic bond markets. First, public debt should when possible be consolidated under a single obligor. The issuance of separate public sector bonds under a variety of issuing entities (government, central banks and other public entities) raises questions about the nature of the government's backing and guarantee. In addition, issuance by a variety of public sector entities may divide the market into less liquid market segments.<sup>18</sup> Second, concentrating the issuance in a limited number of benchmarks, and reopening issues may also improve liquidity. Third, a more liberal attitude towards short selling may help. The practice of selling a security that is not actually owned and borrowing it to finance the position is restricted in many EMEs on the grounds that it may increase leverage. However, such a stance seems to imply the need for better supervision of the financial systems. In contrast, allowing short selling can add to pricing efficiency by bringing additional trading opportunities and liquidity to markets (CGFS (2000)). Fourth, central banks can make an effective contribution to the liquidity of bond markets by using government and other high-grade securities as collateral for their lending operations (see Box 3).

In Latin America, a number of countries have made significant progress in many of these areas. In Brazil, the National Treasury (Tesouro Nacional) is the authority responsible for the issuance and management of public sector debt, both internal and external. The Central Bank of Brazil plays an important debt management role as it is in charge of operating primary auctions of public sector securities. In addition, in the conduct of monetary policy, the central bank plays an active role in repurchase operations linked to these bonds (Amante et al (2007)). In Mexico, the Finance Ministry (Secretaría de Hacienda y Crédito Público) has full responsibility for all activities related to federal government debt and coordinates its activities with other federal agencies in determining the type of instruments to be marketed, their amount and the timing of issues.<sup>19</sup> In order to foster liquidity in the secondary market, the federal government has frequently reopened a small number of reference issues with the intention of building the outstanding amount of each issue until an acceptable degree of liquidity has been reached. In turn, the Bank of Mexico has used government securities to add and subtract liquidity to and from the money market (Jeanneau and Perez Verdia (2005)).

---

<sup>18</sup> In Korea, for instance, the 2-year monetary stabilisation bond has sometimes traded nearly 20 basis points above the 3-year treasury bond, even though they enjoy the same explicit government guarantee.

<sup>19</sup> The Bank of Mexico publishes quarterly calendars that provide guidance to the market about the volume and composition of the forthcoming issue.

### Box 3

#### Repurchase (“repo”) transactions

Repurchase transactions involve the exchange of securities for cash with an agreement to repurchase the securities at a future date.<sup>1</sup> The securities serve as collateral for what is effectively a cash loan. Conversely, the cash serves as collateral for the lending of securities.<sup>2</sup> The key distinguishing feature is that repos can be used to obtain either funds or securities. These instruments play an important role for central banks.<sup>3</sup> For instance, they can serve as: (i) monetary policy instruments for liquidity management – ie by setting an upper and lower limit for short-term market interest rates; (ii) a source of information about market expectations, thus complementing information on expectations over a longer horizon derived from securities with longer maturities; (iii) a mechanism for signalling the stance of monetary policy; (iv) intraday credit provision to support the operation of real-time gross settlement payment systems; and (v) a means to manage foreign currency reserves.

Some of the largest central banks in the region employ repos for liquidity management. In fact, the depth of money markets in these countries has been led by the increasing use of repos in central bank operations. However, the repurchase market continues to be underdeveloped in a number of countries, thus limiting the development of robust money markets (see Table A5 and BIS (2006)). Several features make repos attractive to central banks. First, they do not directly affect bond prices or the yield curve. As a result, they can help to reduce market volatility. For instance, Figueiredo et al (2002) mention this as one of the reasons why the Central Bank of Brazil has preferred repos to outright operations. Second, the injection of good collateral into markets through central bank money market operations can provide a powerful stimulus to bond trading. In other words, repos can help central banks to foster the liquidity and depth of secondary securities markets by using either government or other high-grade securities as collateral for lending operations. Furthermore, repos carry low credit risk as they are collateralised and flexible in terms of their characteristics (amount, maturity, frequency, interest rate and tender system). This allows central banks to tailor them according to liquidity conditions. Finally, repos can help reduce risk associated with shocks transmitted from uncollateralised interbank and money markets or help to ensure access to financial institutions if markets dry up.

Despite these benefits repos also pose important risks to participants – eg credit, operational or liquidity risks, or risks associated with the use of leverage – or systemic risks associated with the linkages they have with other short-term financial and securities markets.

A key question is, how can the authorities support sound and efficient repo markets? Several elements are required, including an adequate market infrastructure, legal frameworks, and settlement systems, as well as low transaction costs, such as those which result from eliminating tax or legal impediments to trading (eg short selling). Authorities can also encourage sound and efficient repo markets by encouraging the pricing of collateral to market, both when initiating the repo and during its life.

<sup>1</sup> Here the term repo may comprise several types of transactions that have equivalent economic functions, eg standard repurchase agreements, sell/buybacks and securities lending.

<sup>2</sup> Central banks only use repos with “general” collateral – that is, sovereign debt instruments rather than private sector debt instruments or equity.

<sup>3</sup> Central banks assign different levels of importance to repos. Repos in some countries constitute the key policy rate, so a shift in the repo rate signals a shift in monetary policy. In other central banks, the overnight or discount rates are used instead. In such cases, repos can still signal the stance of monetary policy or the direction of the key official rate.

## 3.2 Coordination of debt management

Policy coordination is essential when the central bank is directly involved in developing securities markets. Something to keep in mind is that the degree of coordination depends to a large extent on the institutional arrangements in place. In particular, debt management

operations in some countries are separated from the central bank's monetary policy operations, with the government tapping the primary market to finance itself while the central bank uses the secondary market for liquidity reasons. In such cases, the role of coordination is mainly tactical. Under these circumstances, it is important for the central bank and the treasury to share information regarding the market's liquidity (Mohanty (2002)). Implicit coordination, for instance, would mean that the central bank signals interest rate conditions while it extracts information from the yield curve for monetary policy operations. In other countries, central banks play a role as debt managers. Most countries in the region, however, have abolished or restricted direct financing of government deficits by the central bank.

In any case, central banks should be able to promote bond markets, especially in environments of low fiscal deficits and inflation rates, even when central banks play a debt management role. Still, high fiscal deficits increase the need for coordination, especially given the shift towards market-based instruments. A conflict may arise here because high deficits induce expectations of higher inflation and interest rates in the future; therefore, a tightening by the central bank could adversely affect government financing costs.

In general, potentially conflicting objectives of debt management and monetary policy may develop because of the trade-off between minimising the borrowing costs to the government and stabilising prices for central banks.<sup>20</sup> In these circumstances, coordination could help to ensure that price stability remains the main concern of central banks. It could also help to strengthen the market's confidence that the authorities' commitment to market principles will not be weakened by the overlapping responsibilities of these economic authorities. Through prudent debt management, fiscal and monetary policies can also reinforce each other in lowering the risk premia in the structure of long-term interest rates. In this context, it would be desirable for central banks to communicate the effects of government debt levels on the achievements of their monetary objectives. Governments in turn should share information on their current and future liquidity needs.

Another conflict may arise if both central banks and governments issue their own paper, which, unless there is appropriate coordination, could segment the market. In such cases, the respective authorities should communicate the maturity, issue size and auction schedule of both instruments. However, as Mohanty (2002) points out, this coordination could open the door to another issue: whether the central bank should continue to issue its own paper after the treasury bill market develops. Central bank securities have the advantage of allowing the separation of monetary management from debt management, giving the central bank operational flexibility in its monetary policy interventions. On the other hand, they have two important disadvantages: they increase the risk of central bank losses when central bank paper is used to absorb a large amount of excess liquidity, and they may segment the market when other securities exist and thus limit the development of money markets in general (Quintyn (1997)).

#### **4. Concluding remarks**

Monetary policy today relies more than ever on domestic securities, in part because of a shift to market-based instruments and the adoption of IT regimes, which also assign greater prominence to the role of interest rates. Under these circumstances, the attempts of central

---

<sup>20</sup> Some countries express their government debt management objectives in terms of expected cost and risk. The development of domestic bond markets can also be a government objective, especially for countries where short-term debt, floating debt and foreign currency debt are the main alternatives to extensive borrowing from the central bank (see World Bank (2003) and IMF (2004)).

banks to induce actions in the short-term market have spread to longer-term markets, where they have been more effective, improving the overall degree of monetary control.

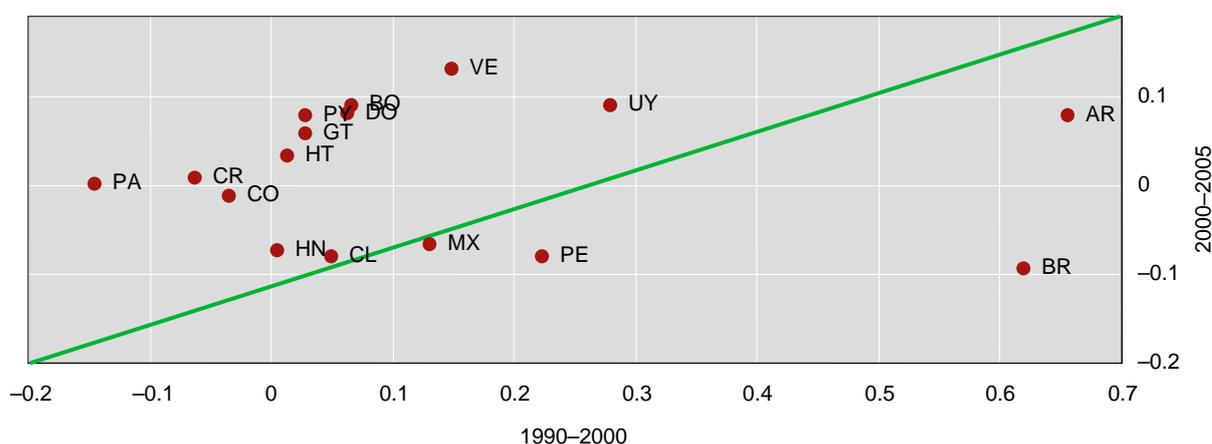
Evidence today suggests that as securities markets in Latin America have developed, the transmission mechanism has changed. At the same time, securities markets, at both the short and the long end, remain underdeveloped across the region. In particular, they remain illiquid. Central banks may still have a role to play in developing these markets, but doing so will require better coordination with treasuries.

## Appendix: Monetary operating procedures and monetary control in Latin America

Over the last 15 years, as central banks have gained more independence, operational procedures have evolved, altering the dynamics and control of financial transmission. Experience suggests that central banks first established monetary targets, with weights that varied significantly over time. Then, with the advent of financial deregulation and innovation, they relied less on targets (due to the sharp decline in the correlation between money and inflation (Figure 1)) and switched to operating procedures that targeted interest rates. Nevertheless, some countries – the smaller ones in particular – have continued to rely on monetary aggregates as intermediate targets due to the difficulties involved in successfully implementing an inflation targeting (IT) regime or to the presence of dual goals (eg inflation and the exchange rate).<sup>21</sup>

Figure 1

### Correlation between inflation and money<sup>1</sup>



AR = Argentina; BO = Bolivia; BR = Brazil; CL = Chile; CO = Colombia; CR = Costa Rica; GT = Guatemala; HN = Honduras; HT = Haiti; MX = Mexico; PA = Panama; PE = Peru; PY = Paraguay; UY = Uruguay; VE = Venezuela.

<sup>1</sup> Annual percentage changes in monthly consumer prices and narrow money (M1).

Sources: IMF; Datastream; national data; BIS calculations.

In Latin America and the Caribbean, changes in operating procedures have also been closely related to the exchange rate regime in place. In the 1990s many central banks

<sup>21</sup> A number of conditions are required for IT to be put in place, including: (i) an appropriate legal framework that identifies price stability as the central bank's primary objective; (ii) the empowerment of the central bank with the operational independence to achieve such objectives; and (iii) the establishment of rigorous accountability and transparency mechanisms. In addition, any other primary goals or targets must be made secondary to the inflation objective. Fiscal dominance must also be eliminated and the financial system must be strengthened. However, meeting such conditions is not always easy. For instance, in Bolivia and Paraguay, the high degree of dollarisation has been a problem. On the other hand, Peru offers an interesting case study of how IT can be successfully implemented in a highly dollarised economy. In Paraguay and Trinidad and Tobago, one obstacle has been the prevalence of excess liquidity in the banking system, which has eroded the role of the policy rate as a signalling device. Finally, in Jamaica, fiscal dominance has been an obstacle in moving towards IT.

targeted the exchange rate, surrendering their capacity to conduct monetary policy. Financial crises and the subsequent adoption of flexible exchange rates encouraged a number of central banks in the region (Brazil, Chile, Colombia, Guatemala, Mexico and Peru) to implement IT schemes, which also implied the adoption of new monetary policy frameworks. However, in others, currency and financial crises led to a collapse of the financial system, preventing central banks from adopting IT. For instance, Argentina and Uruguay had few alternatives but to rely on monetary base targeting for their operational focus (Table 1). Specifically, in the case of these economies, no instruments or markets were available for the central bank to influence the demand for funds in the financial system after their respective crises (Pesce (2006)).<sup>22</sup> However, other arguments for relying on monetary base targets are that bank reserves are assumed to have a reliable and predictable influence on the broader aggregates,<sup>23</sup> and price signals are less reliable in illiquid and volatile financial markets than in more stable ones. In fact, this was the rationale for the continued use of a liquidity target, the “corto”, as the main operating target in Mexico.<sup>24</sup>

IT is consistent with the use of a short-term interest rate as the principal instrument of monetary policy and the adoption of transparent rules to send signals to the market about the monetary policy stance (Carstens and Jácome (2005)). Central banks that have adopted IT now tend to employ overnight interest rates rather than quantity variables as their operational or policy variable.<sup>25</sup> The adoption of overnight interest rates facilitates the task of the central bank since such rates are, in principle, easier to control. In fact, as Figure 2 shows, the level and volatility of interest rates declined across the region in the last few years, which has had a positive impact on commercial bank rates. To maintain interbank interest rates, central banks engage in open market operations or use repos and reverse repos. However, due to the volatility of interbank interest rates, most central banks have opted for an IT scheme with an interest rate corridor to reduce such volatility.<sup>26</sup> With the adoption of short-term money market rates as an operational target, central banks seek to influence the behaviour of longer-term interest rates and the exchange rate. In turn, this influences aggregate demand and supply.

---

<sup>22</sup> In Uruguay, the monetary policy committee (COPOM) recently decided to move from a monetary base growth target to M1 growth, which is considered to be more closely associated with inflation. This move should mitigate the volatility associated with the monetary base multiplier. The central bank is expected to continue with monetary targeting until the right conditions are in place to move to a system of formal inflation targeting and to operate a floating exchange rate policy. In that sense, it is important to clarify that in 2006 the central bank announced a commitment only to the inflation rate, which is intended to be reached within a time horizon of 18 months. Currently, the inflation target range, to end March 2008, is 4.5–6.5%.

<sup>23</sup> From a theoretical viewpoint, the advantage of using an interest rate rule relative to a money rule depends on whether money demand shocks are observable or not. An unobservable money demand shock under a monetary rule would lead to a greater volatility of interest rates, which would then feed through the Phillips curve into higher volatility of output and other macroeconomic variables (see Clarida et al (1999)).

<sup>24</sup> After the 1994–95 devaluation, the Bank of Mexico faced public criticism regarding transparency in the conduct of monetary policy, which led to the use of a visible anchor: a monetary growth target. However, concerns about the risks of using interest rates as an instrument of monetary policy motivated the central bank to use borrowed reserves (the “corto”) as its main policy instrument (Martinez et al (2001)).

<sup>25</sup> Mexico had been an exception. However, in August 2005 the Bank of Mexico started to rely on an interest rate target (the overnight CETES rate, or “tasa de fondeo”) as its main policy instrument.

<sup>26</sup> The floor is typically the overnight rate applicable to a deposit facility for intermediaries that for some reason were unable to place their excess liquidity on the interbank market at the end of the day. The ceiling is usually the rate charged by the central bank to financial intermediaries for overnight lending. In practice, this is similar to some developed economies such as the euro zone.

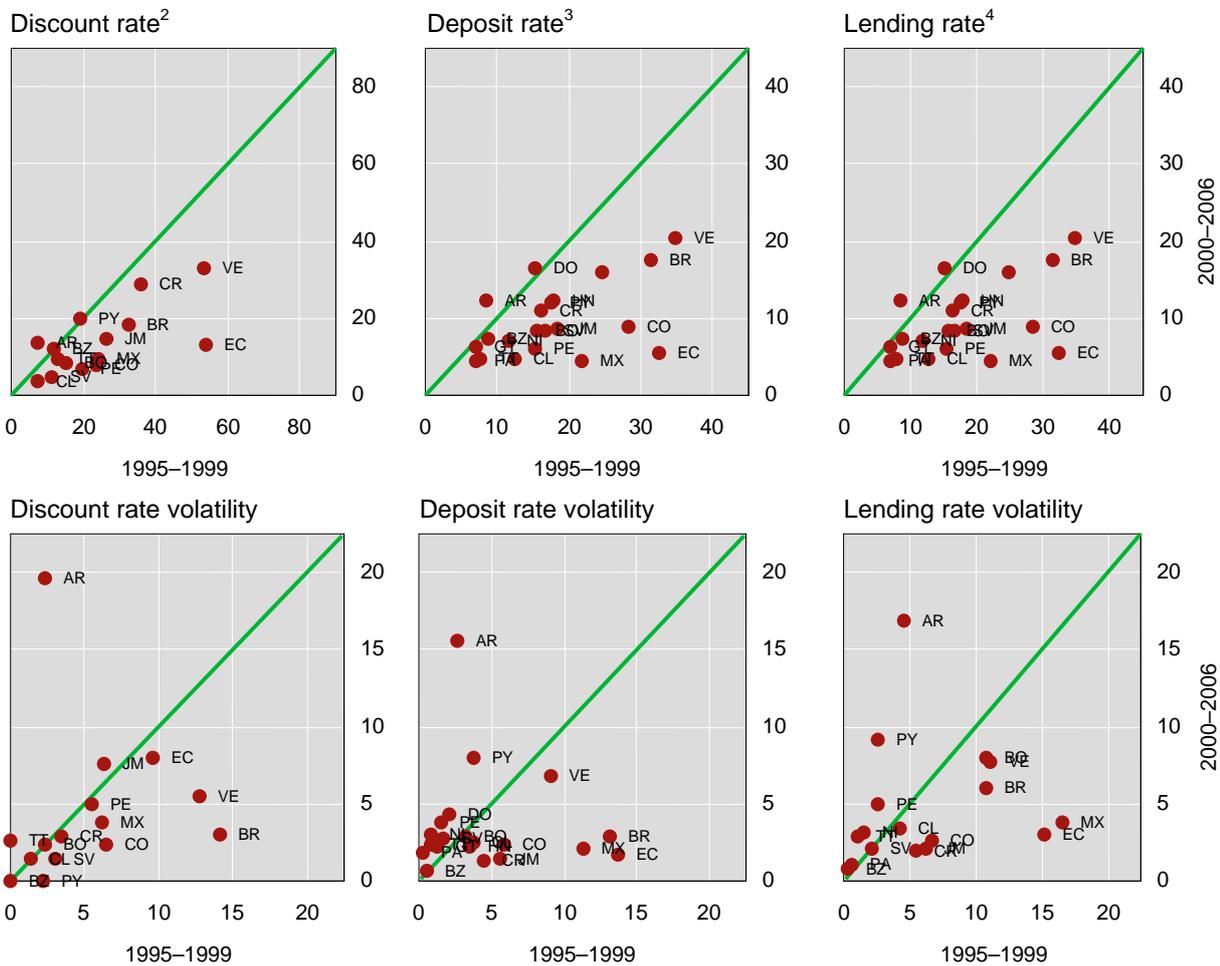
Table 1  
Monetary policy framework

	Exchange rate anchor				Monetary aggregate	Inflation target	IMF-supported or other monetary programme <sup>2</sup>
	Dollarised <sup>1</sup>	Currency board	Fixed pegs	Crawling pegs			
<b>Central America</b>							
Belize			X				
Costa Rica				X			
El Salvador	X						
Guatemala						X	
Honduras				X			X
Nicaragua				X			
Panama	X						
<b>Caribbean countries</b>							
Aruba			X				
Bahamas			X				
Barbados			X				
Dominican Republic							X
ECCU <sup>3</sup>		X					
Haiti							X
Jamaica					X		
Trinidad & Tobago							X
<b>South America and others</b>							
Argentina					X		
Bolivia				X			
Brazil						X	
Chile						X	
Colombia						X	
Ecuador	X						
Mexico						X	
Peru						X	
Venezuela			X				
Guyana					X		
Paraguay							X
Suriname					X		
Uruguay					X <sup>4</sup>		

<sup>1</sup> Another currency is legal tender. <sup>2</sup> May imply floors for international reserves and ceilings for the central bank's net domestic assets, and consequently also indicate targets for reserve money. <sup>3</sup> Eastern Caribbean Currency Union members are: Antigua and Barbuda, Dominica, Grenada, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines. <sup>4</sup> Gradually moving to an inflation target.

Source: IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions*, 2004.

Figure 2  
Interest rate levels and volatilities<sup>1</sup>  
In per cent



AR = Argentina; BO = Bolivia; BR = Brazil; CL = Chile; CO = Colombia; CR = Costa Rica; EC = Ecuador; JM = Jamaica; MX = Mexico; NI = Nicaragua; PA = Panama; PE = Peru; PY = Paraguay; SV = El Salvador; TT = Trinidad and Tobago; UY = Uruguay; VE = Venezuela.

<sup>1</sup> Measured as standard deviations of monthly data. <sup>2</sup> Line 60 of *International Financial Statistics*. For Argentina, seven-day interbank rate; for Brazil, SELIC overnight rate; for Chile, monetary policy rate; for Colombia, expansion BR's minimum intervention rate; for Jamaica, policy rate; for Mexico, bank funding rate. <sup>3</sup> Line 60L. <sup>4</sup> Line 60P.

Sources: IMF, *International Financial Statistics*; national data; authors' calculations.

Which interest rate the central bank should focus on as the main or subsidiary target is an important question that central banks must answer. Van't Dack (1999) points out that, from a practical point of view, it should be the overnight rate. However, it has proven very difficult for some countries (eg Uruguay) to conduct certain operations that are common in other countries, such as reverse repos, due to the lack of liquidity. In other countries, such as Costa Rica, the overnight rate has only recently been adopted with the expectation of setting a floor on short-term rates. However, its effectiveness still needs to be tested.<sup>27</sup> The problem

<sup>27</sup> Under current macroeconomic conditions, this floor is expected to limit speculative capital inflows and stimulate investment in longer-term securities.

with targeting overnight rates is that they can experience sudden changes, resulting from temporary technical pressures, which the central bank might not always want to counteract. In addition, the financial system might be so underdeveloped that the overnight rate simply plays no major role in transmission. An alternative approach would be for central banks to rely on interest rates that have a longer maturity than the overnight rate (eg Guatemala employs a seven-day CD rate). However, there are drawbacks to this approach. The impact on liquidity would be smaller than in a market for bank reserves, given that the central bank would have limited influence on either the supply or the demand side at the longer end. In addition, targeting longer-term interest rates might make it difficult to determine how market expectations influence rates at the relevant horizon.

### ***Increasing reliance on market-based instruments***

The shift towards interest rates as the main policy instrument has been complemented by a general change in operating procedures, which has altered the manner in which central banks interact with financial markets. Despite the fact that several central banks in the region still conduct monetary policy through direct instruments,<sup>28</sup> there has been a gradual shift towards greater use of indirect instruments (ie market-based instruments). Such instruments seek to affect overall monetary and credit conditions through the demand or supply of liquidity.<sup>29</sup>

Table 2

### **Use of monetary instruments at various stages of development**

In per cent of the countries in the sample

	<b>Developing countries</b>	<b>Emerging economies</b>	<b>Developed countries</b>
Credit and interest rate controls	4	22	0
Liquid asset ratio (LAR)	65	30	9
Reserve requirements	100	96	70
Open-ended/standing facilities	96	96	100
Discretionary/market-based tools	96	96	100

Note: Data relate to 23 countries in each of the three categories.

Source: IMF (2004).

Central banks around the world employ different operational tools (see Table 2). Developing and emerging market economies still rely on credit and interest rate controls and liquid asset

<sup>28</sup> Traditionally, monetary authorities in developing countries and EMEs have relied heavily on direct, or non-market, instruments for the conduct of monetary policy. Such instruments include interest rate controls, credit guidelines, reserve requirements and lending through the discount window. Heavy reliance on direct controls has a number of potential disadvantages. First, credit is often denied to certain sectors (eg small and medium-sized enterprises), which leads to a misallocation of resources, with possibly significant economic costs. Second, it can impair the supply of financial services; for example, high reserve requirements function as an implicit tax on the banking sector. Third, controls are often circumvented by informal or offshore financial sectors that operate in parallel to the formal domestic sector. As a result, monetary management can become a very complicated exercise.

<sup>29</sup> For instance, several countries in the Caribbean still rely on quantitative instruments (eg Aruba, the Bahamas, Belize and Trinidad and Tobago).

ratios, most of which have largely been phased out in developed countries. In addition, all the developing countries in the sample rely on reserve requirements. Open-ended standing facilities and discretionary market-based instruments are also part of the standard toolkit for the conduct of monetary policy in developing countries and EMEs. However, the key difference vis-à-vis developed countries is that most developing countries and EMEs use a broader set of tools, which could indicate the presence of market and institutional shortcomings.

Table 3  
Use of monetary instruments in selected economies  
of Latin America and the Caribbean<sup>1</sup>

	Credit and interest rate controls	Liquid asset ratio (LAR)	Reserve requirements	Open-ended standing facilities	Discretionary/market-based tools
Argentina	No	No	Yes	Yes	Yes
Brazil	Yes	No	Yes	Yes	Yes
Colombia	Yes	Yes	Yes	Yes	Yes
Dominican Republic	No	No	Yes	Yes	Yes
Ecuador	No	Yes	Yes	No	Yes
Jamaica	No	Yes	Yes	No	Yes
Paraguay	No	No	Yes	No	No
Uruguay	No	Yes	Yes	Yes	Yes

<sup>1</sup> See details in Tovar (2007).

Source: Central banks.

In Latin America and the Caribbean, credit and interest rate controls are slowly disappearing (Table 3). Although some countries, such as Brazil and Colombia,<sup>30</sup> still employ interest rate ceilings or directed credit, other monetary instruments, such as requirements for banks to hold minimum amounts of specified liquid assets, are more widespread. Reserve requirements continue to be common for the conduct of monetary policy. In this respect, data collected in a questionnaire to central banks show that there was a clear decline in their levels prior to this decade (Table 4), while in more recent years, reserve requirements have remained more or less stable.<sup>31</sup>

<sup>30</sup> In May 2007 Colombia adopted three measures to reduce appreciation pressures and high credit growth: (i) a marginal reserve requirement (27% for checking accounts, 12.5% for savings accounts and 5% on CDs, up from 13%, 6% and 2.5%, respectively) to slow credit; (ii) a six-month 40% deposit, in pesos, at the central bank on all foreign borrowing – with this measure, the central bank aims to increase the cost of foreign borrowing and reduce liquidity in the economy; and (iii) a cap on the amount that companies can invest in derivatives and hedging operations; more specifically, a 500% leverage limit on banks and brokerages.

<sup>31</sup> Arena et al (2006) and Tovar (2007) provide additional evidence.

Table 4  
Reserve requirements<sup>1</sup>

In percentages

	1990	1998	2000	2006	Remuneration (latest) <sup>1</sup>
Argentina	5.0–88.0		15.0–22.0	14.0–35.0	BMR
Chile	4.0–10.0	9.0	3.6–9.0	3.6–9.0	No
Colombia	18.2	31.0	4.8	5.7	BMR
Mexico	0.0	0.0	0.0	0.0	
Peru	52.5	7.0	7.0	6.0	No
Venezuela	15.0	17.0	17.0	15.0	No

<sup>1</sup> BMR = Below market rate.

Source: BIS (2006).

Open market operations, ie operations used at the discretion of the central bank and bearing an interest rate linked to market conditions, are widely employed in the region. The use of standing facilities is also common. In this regard, it is worth noting that while some smaller economies, such as the Dominican Republic and Uruguay, rely on “Lombard-type” lending facilities, the larger ones, such as Argentina, Brazil and Colombia, manage liquidity through the use of repurchase agreements (possibly reflecting the higher degree of financial market development). For instance, in Brazil the central bank’s monetary policy committee (COPOM) sets a target for the SELIC interest rate, which is an average measure of the rates on overnight repo operations involving federal domestic marketable debt registered in the SELIC system. The central bank then uses open market operations to achieve this target together with other traditional monetary policy instruments to control the money supply.

### ***Implications for the effectiveness of market-based instruments***

The adoption of market-based instruments requires the existence of developed financial systems that offer monetary authorities a choice of markets in which to operate and guarantee that actions in short-term markets will spread effectively to other market segments. Illiquid or volatile money markets may limit the ability of investors to undertake maturity transformation along the yield curve.<sup>32</sup> As is well known, financial markets in the region are still at an early stage of development and are often segmented.<sup>33</sup> Furthermore, they often lack the depth and liquidity necessary for adopting market-oriented monetary policies. In some countries, other factors, such as the lack of a stable macroeconomic environment, together with a low degree of central bank autonomy, have also limited the success of money market operations for the conduct of an efficient monetary policy.

<sup>32</sup> If the market for overnight funds is liquid and the overnight rate is relatively stable, a bank may feel it is worth the risk to take a funding mismatch by borrowing overnight, adding a margin, and lending for, say, 14 days. In turn, if the 14-day market is liquid and stable, the bank may fund at 14 days and lend at 30 days, and so on. However, banks only accept the maturity mismatch required to create the liquid yield curve if the availability of funds (liquidity) and the variability of interest rates (interest rate risk) are manageable at each maturity (see World Bank and IMF (2001)).

<sup>33</sup> This note focuses on the formal domestic sector. However, informal, unregulated parallel markets should not be forgotten when assessing the challenges and risks faced by central banks in conducting monetary policy.

The lack of liquidity in government securities should be a concern to central banks for at least three reasons (CGFS (2000)). First, the lack of liquidity might limit the central bank's ability to provide and absorb the necessary amount of funds through its open market operations (outright purchases and repos of government securities) and, in turn, such operations could have unintended effects such as excessive price volatility. In situations of financial stress, this excessive volatility can further complicate the conduct of monetary policy due to financial stability considerations. Second, effective monetary operations require appropriate information about prices in government securities markets. This includes information about implied expectations contained in the term structure of interest rates. Thus, differences in liquidity across the term structure between fixed-coupon and inflation-linked bonds could easily distort the information derived. Third, liquid government securities should improve the financial intermediation process, making it more efficient, stable and resilient to adverse shocks. It is worth noting that in extreme situations, lack of liquidity can also lead to the closure of markets and interruptions in financing.<sup>34</sup>

Table 5  
**Average daily money market turnover**  
As a percentage of outstanding banking assets

	Total money market		Interbank repo market		Others	
	2000	2005	2000	2005	2000	2005
Argentina				0.1	0.61 <sup>1</sup>	0.21 <sup>1</sup>
Chile		0.2				0.22 <sup>2</sup>
Colombia	1.2	2.4	0.6	0.9	0.63 <sup>3</sup>	1.6
Mexico	7.3	5.9			0.04 <sup>4</sup>	1.75 <sup>5</sup>
Peru	0.3	0.3	0.3	0.3		
Venezuela	0.7	0.6	0.7	0.6		

<sup>1</sup> Call market (interbank loans). <sup>2</sup> Interbank short-term loans. <sup>3</sup> Includes repo and buy/sellbacks.  
<sup>4</sup> Includes reverse repos. <sup>5</sup> Mexican derivatives exchange. Daily average volume for TIIE (interbank interest rate) 28-day futures contracts traded in Mexder.

Source: BIS (2006).

Evidence for the region shows that interest rate volatility has declined in different market segments (Figure 2), implying that progress in the development of securities markets has been made, particularly at the short end. However, the daily turnover of money markets (measured as a percentage of banking assets) remains very low, indicating the need for further progress. In fact, only Mexico and, to a lesser extent, Colombia appear to have achieved a reasonable degree of liquidity in their money markets (Table 5).

<sup>34</sup> For instance, in Colombia during the second half of 1998, the cost of government paper (TES) reached 35%, compared with 23.6% at the beginning of the year. A similar problem was experienced during 2002, leading to the so-called "mini-TES" crisis. During this period, the government was unable to tap the market for several months due to the high costs of financing.

## References

- Agénor, P (2004): *The economics of adjustment and growth*, MIT Press.
- Alfaro R, H Franken, C Garcia and A Jara (2004): “Bank lending channel and the monetary transmission mechanism: the case of Chile”, in L. Ahumada and R. Fuentes (eds), *Banking Structure and Monetary Policy*, Central Bank of Chile.
- Amaya, C (2006): “Interest rate setting and the Colombian monetary transmission mechanism”, *Revista Ensayos Sobre Política Económica*, no. 50, Bogotá, June.
- Amante, A, M Araujo and S Jeanneau (2007): “The search for liquidity in the Brazilian domestic government bond market”, *BIS Quarterly Review*, June.
- Archer, D (2006): “Implications of recent changes in banking for the conduct of monetary policy”, *BIS Papers* no 28, August.
- Arena, M, C Reinhart and F Vasquez (2006): “The lending channel in emerging economies: are foreign banks different?”, NBER Working Paper 12340, June.
- Armas, A and F Grippa (2006): “Metas de inflación en una economía dolarizada: la experiencia del Perú”, in A Armas, A Ize and E Levy-Yeyati (eds), *Dolarización financiera: La agenda de política*, Fondo Monetario Internacional [IMF] and Banco Central de Reserva del Perú.
- Bank for International Settlements (BIS) (2006): “Transmission mechanisms for monetary policy in emerging market economies: what is new?”, note prepared for the Emerging Market Deputy Governors’ Meeting, Basel, December. Forthcoming as *BIS Papers*.
- Bernanke, B and M Gertler (1995): “Inside the black box: the credit channel of monetary policy transmission”, *Journal of Economic Perspectives*, vol. 9, no. 4, autumn, pp. 27–48.
- Betancour, C, J De Gregorio and J Medina (2006): “The great moderation and the monetary transmission mechanism in Chile”, paper prepared for the BIS Emerging Market Deputy Governors’ Meeting, Basel, December.
- Betancourt, R, H Vargas and N Rodriguez (2006): “Interest rate pass-through in Colombia: a micro-banking perspective”, Borradores de Economía, Banco de la República de Colombia, Bogotá.
- Bigio S and J Salas (2006): “Efectos no lineales de choques de política monetaria y de tipo de cambio real en economías parcialmente dolarizadas: un análisis empírico para el Perú”, *Serie Documentos de Trabajo DT 2006-008*, Banco Central de Reserva del Perú.
- Capistrán, C and M Ramos-Francia (2006): “Inflation dynamics in Latin America”, Bank of Mexico Working Papers no. 2006-11, November.
- Carstens, A and L Jacomé (2005): “Latin American central bank reform: progress and challenges”, IMF Working Paper WP/05/114, Washington DC.
- Céspedes, L and C Soto (2005): “Credibility and inflation targeting in an emerging market: the case of Chile”, Working Papers, Central Bank of Chile.
- Clarida, R, J Gali and M Gertler (1999): “The science of monetary policy: a new Keynesian perspective”, *Journal of Economic Literature*, vol. 37, no. 4, pp. 1661–07, December.
- Committee on the Global Financial System (CGFS) (2000): *Market Liquidity: Research Findings and Selected Policy Implications*, March, Basel.
- Espinosa-Vega, M and A Rebucci (2004): “Retail bank interest rate pass-through: is Chile atypical”, in L Ahumada and R Fuentes (eds), *Banking Structure and Monetary Policy*, Central Bank of Chile.
- Figueiredo, L, P Fachada and S Goldstein (2002): “Public debt management and open market operations in Brazil”, in *BIS Papers* no. 11, June.

Gaytán, A and J Gonzalez (2006): “Structural changes in the transmission mechanism of monetary policy in Mexico: a non-linear approach”, Bank of Mexico Working Papers, no. 2006-06, April.

Group of Ten (G10) (2001): “Consolidation in the Financial Sector”, Bank for International Settlements, January.

International Monetary Fund (IMF) (2004): “Monetary policy implementation at different stages of market development”, Staff of the Monetary and Financial Systems Department, 26 October.

Jeanneau, S and C Pérez Verdia (2005): “Reducing financial vulnerability: the development of the domestic government bond market in Mexico”, *BIS Quarterly Review*, December.

Kamin, S, P Turner and J Van't Dack (1998): “The transmission mechanism of monetary policy in emerging market economies: an overview”, *BIS Policy Papers* no. 3, January.

Lahura, E (2006): “El efecto traspaso de la tasa de interés y la política monetaria en el Perú: 1995–2004”, *Revista de Estudios Económicos*, January.

Leiderman, L, R Maino and E Parrado (2006): “Metas de inflación en economías dolarizadas”, in A Armas, A Ize and E Levy-Yeyati (eds) *Dolarización Financiera: La agenda de Política*, Fondo Monetario Internacional [IMF] and Banco Central de Reserva del Perú.

Loayza, N and K Schmidt-Hebbel (2004): “Monetary policy functions and transmission mechanisms: an overview”, in N Loayza and K Schmidt-Hebbel (eds), *Monetary Policy: Rules and Transmission Mechanism*, Central Bank of Chile.

Martinez, L, O Sánchez and A Werner (2001): “Monetary policy and the transmission mechanism in Mexico”, *BIS Papers* no. 8, November.

Mishkin, F (1995): “Symposium on the monetary transmission mechanism”, *Journal of Economic Perspectives*, vol. 9, no. 4, autumn, pp. 3–10.

Mohanty, M (2002): “Improving liquidity in government bond markets: what can be done?”, *BIS Papers* no. 11, June.

Moreno, R (2007): “Monetary policy transmission and the long-term interest rate in emerging markets”, *BIS Papers*, forthcoming.

Pesce, M (2006): “Transmission mechanism for monetary policy in emerging market economies: what is new?”, paper prepared for the BIS Emerging Market Deputy Governors Meeting, Basel, December.

Quintyn, M (1997): “Government versus central bank securities in developing market-based monetary operations”, in V. Sundarajan, P. Dattels and H. Blommestein (eds), *Coordinating Public Debt and Monetary Management*, IMF.

Sellon, G (2002): “The changing U.S. financial system: some implications for the monetary transmission mechanism”, *Economic Review*, First Quarter, Federal Reserve Bank of Kansas City.

Sundararajan, V and P Dattels (1997): “Coordinating public and monetary management in transition economies: issues and lessons from experience”, in V Sundararajan, P Dattels and H Blommestein (eds), *Coordinating Public Debt and Monetary Management*, IMF.

Tovar, C (2007): “Structural transformation of financial systems and its implications for monetary policy in Latin America and the Caribbean”, *BIS Papers* no. 33, February.

Van't Dack, J (1999): “Implementing monetary policy in emerging market economies: an overview of issues”, *BIS Policy Papers* no. 5, March.

Vargas, H (2006): “Public debt market risk: the effects on the financial system and on monetary policy - the case of Colombia”, *BIS Papers* no. 28, August.

—— (2007): “The transmission mechanism of monetary policy in Colombia”, *BIS Papers*, forthcoming.

World Bank and International Monetary Fund (2001): “Developing Government Bond Markets: A Handbook”, Special Spring Meetings Edition.